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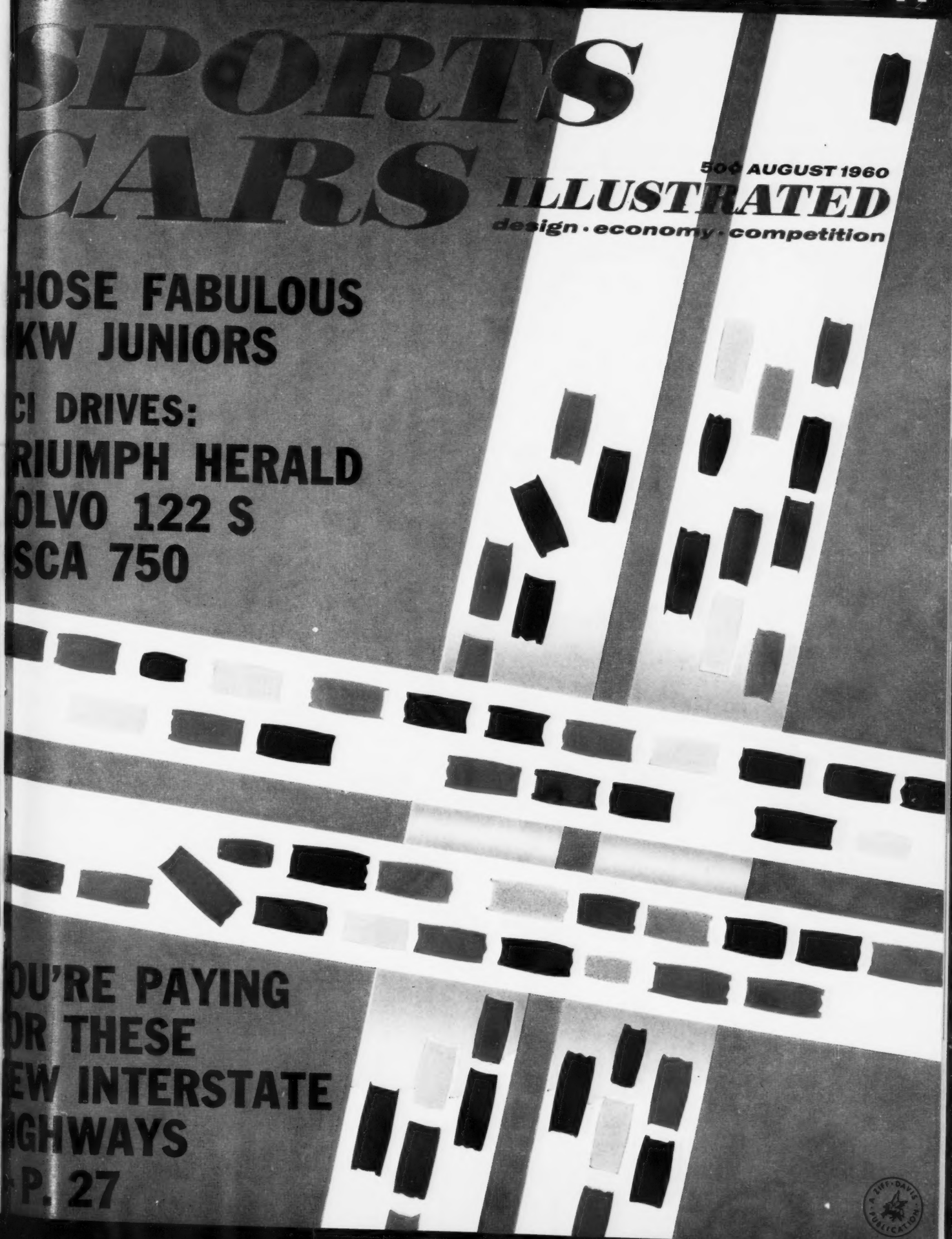

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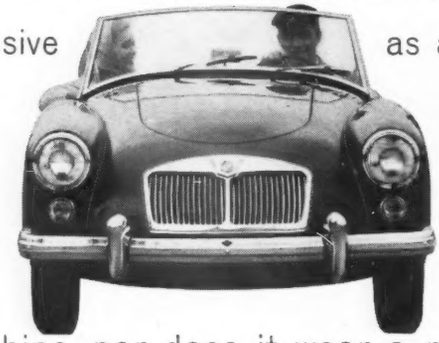

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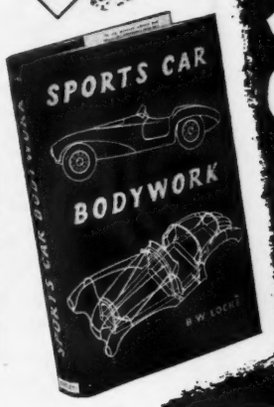

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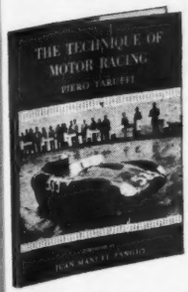

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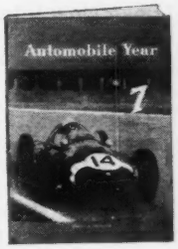

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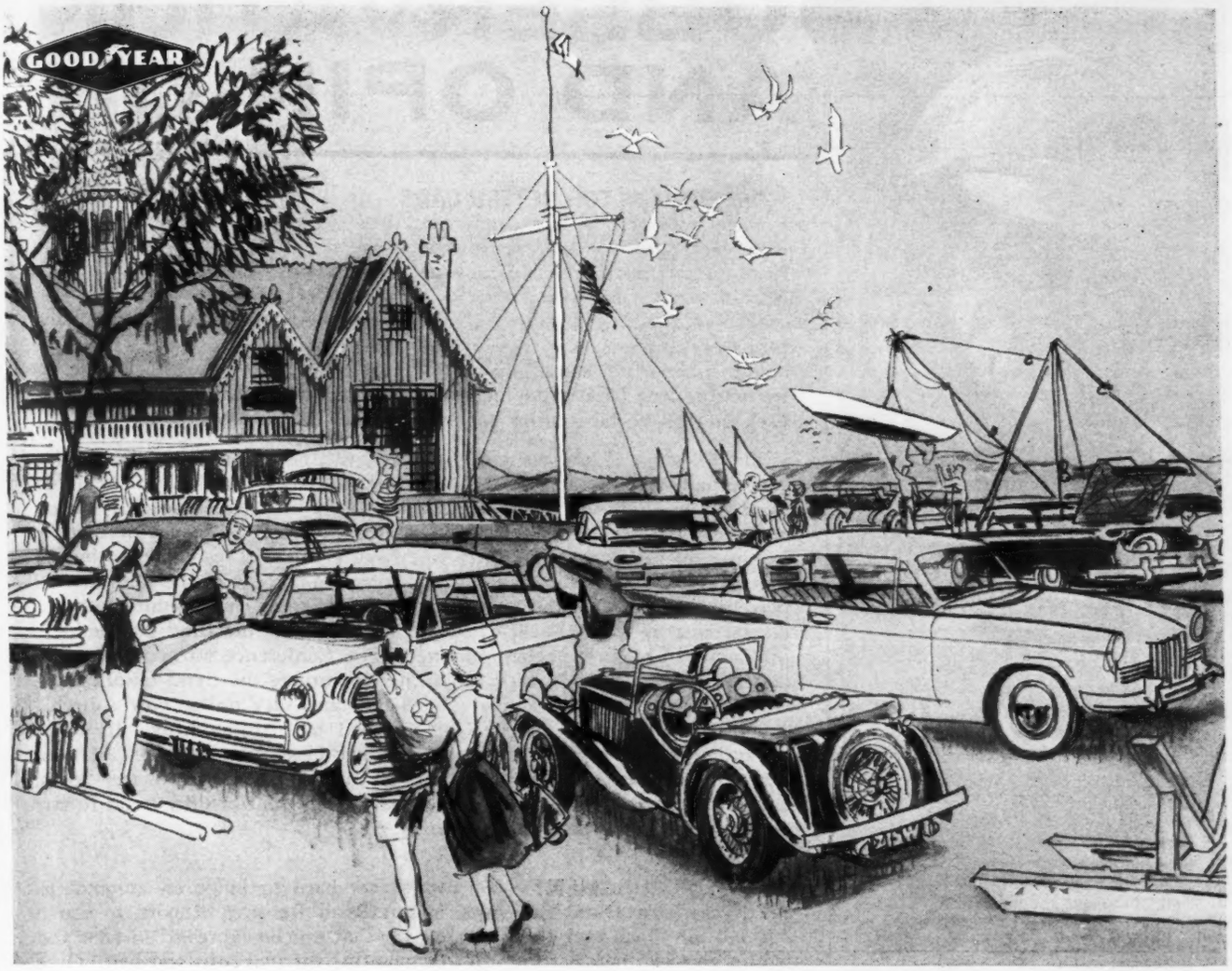

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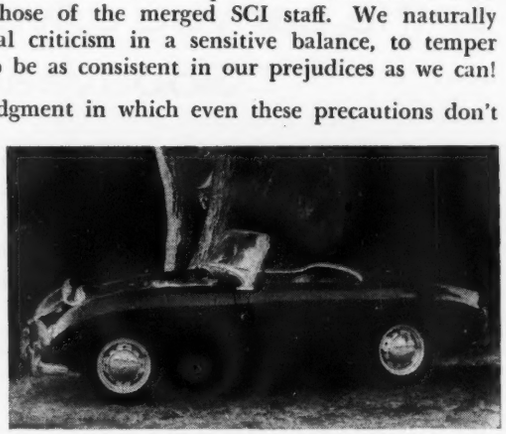
OBSERVATION AND OPINION

WORSE ROADS FOR BETTER CARS – Are the tax dollars the government collects from you, as a highway user, being used to benefit you? In this issue Bob Gorman describes and explains the massive Federal Interstate roadbuilding project that affects us all in many different ways. In this election year it's important to know the answers to these questions and others: is the Interstate System a good one – even on paper? Is it being properly managed? Is it on schedule? Most importantly, are we going to be able to pay for it? You'll find out on page 27. And don't miss Mike Davis's fascinating look back at the highways of today that General Motors predicted back in 1939, to be seen on pages 28 and 29.

The dilemma of how we're going to pay for the roads we need was given a new twist recently at a Highway Transportation Congress. A Conference of Highway Users told the Congress that the present trend toward smaller and more economical automobiles would eventually result in a substantial lessening of Federal and state revenue from gasoline taxes. They estimated that by 1964 smaller cars would account for 42 percent of the sales and 22 percent of the cars on the road, and figured that this could reduce total gas tax revenue by $548,000,000 – this at about the time the Interstate highway program will really be needing money! The Conference warned against an increase in the gas tax, which could only accentuate the trend toward more economical cars. They pointed out that from every dollar now collected from road users, only 57 cents are applied to highway work. It would certainly seem most logical to make a change here, diverting more of these funds to the purpose for which they're intended: building better roads. Certainly there's no reasonable way to halt the present healthy trend to cars that are built to do their jobs efficiently.

AREAS OF JUDGMENT – It's always very hard to judge an automobile. We try as hard as anybody does, in our Road Research Report, to search out and pin down everything about a car that can be expressed in facts and figures, to make it easier for you to choose the car that suits you best. Once these facts are tabulated, further discussion depends on individual likes and dislikes – in this case, those of the merged SCI staff. We naturally weigh such relatively personal criticism in a sensitive balance, to temper its subjectivity, and we try to be as consistent in our prejudices as we can!

But there is an area of judgment in which even these precautions don't help, in which every like and dislike is intensely personal. This is styling. In our issue of two months back, SCI allowed into print some needlessly subjective criticism of the shape of the Healey Sprite – criticism of a tone and tenor that was unwarranted. You readers reacted, as you should have: "We think she is a beautiful little sweetheart . . . simple lines with no fuss and feathers." "What other sports car has that charming character and those winning ways?" And the case was closed when a sparkling Sprite was judged Best in Class by a distinguished jury at SCI's 1960 Concours D'Elegance (see page 52).



As was also pointed out two months ago, the rugged, willing Sprite has beautifully backstopped the TC and TD as the staple sports car of today. It can do everything those cars could, while carrying more things in more comfort and using less gas doing it. That the Sprite's potential is yet unplumbed is shown by the spectacular performance of a Speedwell-modified car, to be seen and wondered at on page 32. That a modified car can easily travel half again as fast is terrific tribute to the firm, strong heart of the standard Sprite.

–Karl E. Ludvigsen

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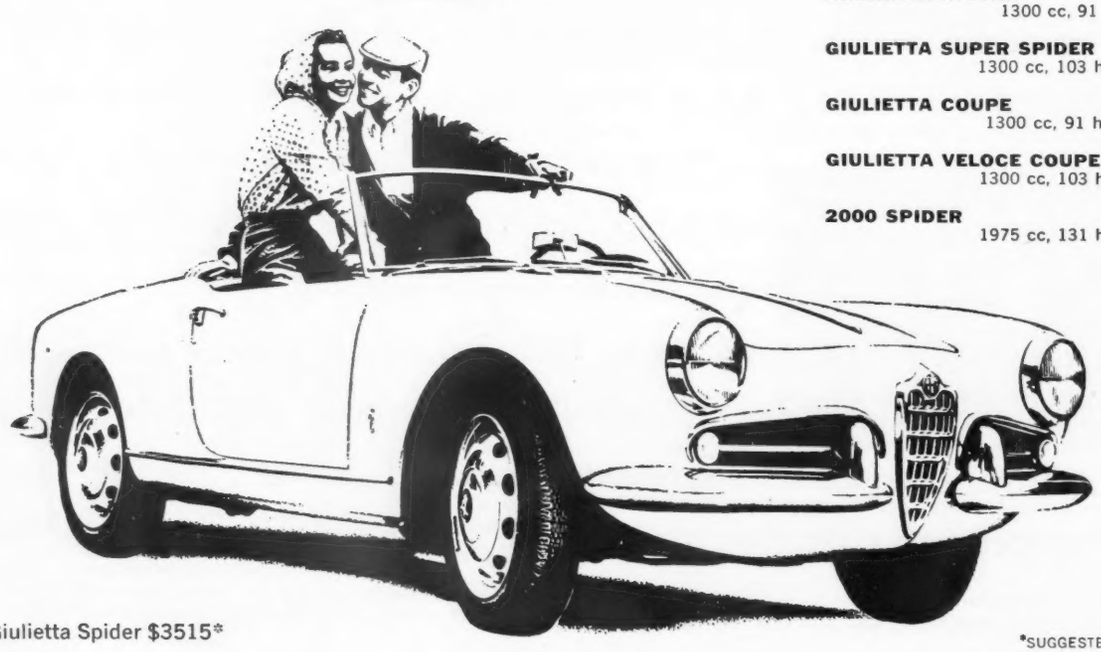

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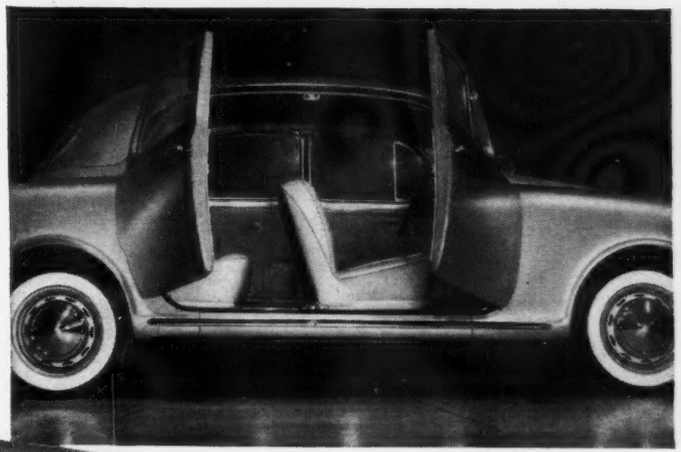

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LETTERS

STOP THAT MOTOR

The article in the March SCI on the Dodge Dart makes a point of mentioning that you have to have the heater motor on in order to get fresh air. This is not exactly true, and the understandable ignorance on the part of your usually well-informed magazine emphasizes my pet gripe – poor attention to details on the car manufacturer's part.

I have been driving a '59 Plymouth Sport Fury for almost a year and have only recently found out how to shut the heater motor off without cutting off the supply of fresh heated air. By pushing and then pulling on the "Def" button you can cut the fan without shutting things down completely.

J. Kauffman, Jr.
Baltimore, Md.

DRAG RULES

There is one point I would like to clarify in Roger Huntington's good story on sports car dragging. Mr. Huntington seems to give all the credit for the new N.H.R.A. sports car classes to Jack Horsley and N.H.R.A. The fact is that these same classes were used very successfully at our Charlestown Dragway for the entire 1959 season! They were then submitted to the rules committee and accepted for national use almost verbatim. The only things changed were a couple of class breaks, as far as displacements were concerned.

These classes were compiled by Bob McCullough and Ronnie Beausolier, both members of the Southern New England Timing Association and the University Sports Car Club of Providence. Both men put in many hours making up these classes and deserve most of the credit for them. Mr. McCullough is very active at our strip with sports car classification and inspection.

Ed Sarkisian
Director of Public Relations
Southern New England Timing Assn.
Providence, Rhode Island

Thanks for setting the record straight. Sports car owners should be grateful to Mr. McCullough and Mr. Beausolier for opening new competition vistas to them.

EXPENSIVE CAMERA CASE

The reason a Porsche glovebox won't accommodate a Rolleiflex (Road Research Report, SCI, May, 1960) is because cameras aren't supposed to be put there. Heats up the film, ruins it. And Wetzlar will agree insofar as their product is concerned. This is German efficiency. But don't take my word, check with that other 1 Park Avenue magazine, Popular Photography.

Ed Carlin Jr.
Philadelphia, Pa.

You're absolutely right. Heat is bad for film and a camera can get banged around in a glove compartment but the Rollei's familiar size is a good index for a compartment's storage capacity.

DOWN WITH GRAVITY

We regret the necessity of taking action against your usually excellent magazine. You must appreciate, however, that we cannot possibly permit the name of the great Sir Isaac to be used in the facetious manner of your April issue (Centrifugat, p. 38).

A full public apology will be acceptable. Otherwise we may deem it necessary to cancel your gravitation.

J. Locke,
Principia Defensor
Isaac Newton Admiration Society
Woolsthorpe-near-Grantham

OPEN FOR DISCUSSION

In the March 1958, SCI Griff Borgeson wrote the Plymouth Fury "is a big Detroit sedan that can easily out-corner many bona-fide sports cars." I told myself it must have been a misprint or something, still believing the old story that a sports car can outrun anything from Detroit by virtue of better suspension, better brakes and a good amount of acceleration and top speed.

However after recently witnessing a race on a twisty road between an Austin-Healey 3000 and a Plymouth Fury, as far as I can see there is no longer any advantage in buying a sports car, when an American car can stay with a sports car on any public road and has the advantage of parts and service and also passenger and luggage space.

I don't think you will publish this letter because it could hurt your business and the sports car business in general, but I am sure many other people would like to hear what you can say for the sports cars versus Detroit.

W. R. Mead III
Lynchburg, Va.

We at SCI endorse a policy of peaceful coexistence in the battle of "sports cars vs. Detroit" and extend it so far as to deplore racing on public roads. However many of our more partisan readers may have comments Mr. Mead will find interesting. We invite them to write.

POINT OF ORDER

I have been a reader for some time, and I have been meaning to write expressing my appreciation. An opportunity now occurs to combine this with a correction upon a point concerning English life.

In your review of the Rover 3 liter (May '60) you mentioned the possibility of a younger son being sent down from Oxford for slovenly dress. From the hard-won experience of four years, I can assure you that this is one thing it is quite impossible to be sent down for (my own college regarded contrasting fluorescent socks, sandals, battledress trousers and pyjama jacket with complete equanimity).

Seriously, it is seldom that it would be possible to correct you, and I do congratulate you on the quality of your magazine. Incidentally, what about those SCCA classes—is a Berkeley B95 or a Sprite really faster than a Lotus 7A, or a Morgan Plus 4 faster than a Lotus Elite?

George Gush
Battle, Sussex, England

We'll stick to our guns and concur with the Oxford Dons that there is nothing slovenly about the wardrobe you describe.

ILLINOIS
Cordes Motor Co., Alton
Bender-Rieger, Inc., Barrington
Oliver C. Joseph, Inc., Belleville
Oliver Plymouth, Belleville
Walter Schroeder Motors, Inc., Berwyn
Rust Cadillac Co., Bloomington
Hunter Motor Co., Carbondale
World Wide Motors, 309 S. Locust, Champaign
Lee Alan Imports, Chicago
Delta Import Motors, Inc., Chicago
Hensen Import Motors, Chicago
Northtown Motor Co., Chicago Heights*
Shakespeare Motors, Danville*
Midwest Rambler Corp., Decatur
Sawyer Service Station, De Kalb
Swenson-Marusic Buick, Granite City
Hinsdale Import Motors, Hinsdale
Cope Motor Co., Jerseyville
W-G Motors, Inc., Mt. Vernon
Eagleson Olds-Cadillac Co., Olney
Character Cars, Inc., Peoria
Forest City Imported Cars, Ltd., Rockford
Rallye Motors, Ltd., Springfield
Samors Motor Co., Streator
Imperial Motors, Inc., Wilmette

INDIANA
B & B Import Car Co., Inc., East Chicago
Cloverleaf Motors, Inc., Fort Wayne
Snowdon Motor Sales, Gary
Imported Cars, Inc., Indianapolis
Monarch Auto Sales, Inc., Indianapolis
Brown Motor Co., 12 N. 8th St., Richmond
Fall City Auto Imports, Inc., Jeffersonville
O. M. Foxworthy, Inc., Lafayette
Lou's Imported Motors, Logansport
Frick Motors, Inc., Michigan City
Dutch Hurst Motors, Muncie
Hoosier International Motors, South Bend
Grieger Motor Sales, Valparaiso
Hoosier International Motors, Warsaw

IOWA
Tri-City Foreign Cars, Inc., Davenport
Goodman Motor Co., 4611 S.E. 14th St. Des Moines
Johnston Import Motors, Fort Dodge
Glover Motor Co., Ottumwa
Marken Motor Co., Waterloo

OHIO
Long Motors, Inc., Cadiz
Cambridge Sport Shop, Cambridge
Charles Raymond, Inc., Cincinnati
MG Motor Sales, Inc., Cleveland
Quality Auto Sales, Inc., Cleveland
Car France, Inc., Cleveland*
Imported Motor Car Co., Columbus
Akron Cars, Inc., Cuyahoga Falls
Car Imports of Dayton, Inc., Dayton
East Liverpool Central Service Co., East Liverpool
Suburbanite Motors of Ohio, Inc., Mansfield
Stark Sports Cars, Inc., Massillon
Continental Motors, Ltd., Reading*
Sandusky Imported Motors, Sandusky
Jaguar-Cleveland Motors, Inc., Cleveland Heights
Jack Hardesty, Inc., Spencerville
Foreign Cars of Toledo, Inc., Toledo
Stoddard Imported Cars, Inc., Willoughby
Red's Foreign Car Imports, Inc., Youngstown*
Eastway Sports Cars, Inc., Columbus
Foreign Motors, Wilmington

WISCONSIN
Biddle Foreign Cars, Inc., Fond du Lac
Foreign Cars of Madison, Inc., Madison
Grant Gordon, Marinette
Wisconsin Auto Sales Co., Milwaukee
Louis Auto, Inc., Milwaukee
Roewardt-Thomson, Inc., Sheboygan
Baker Pontiac, Wisconsin Rapids
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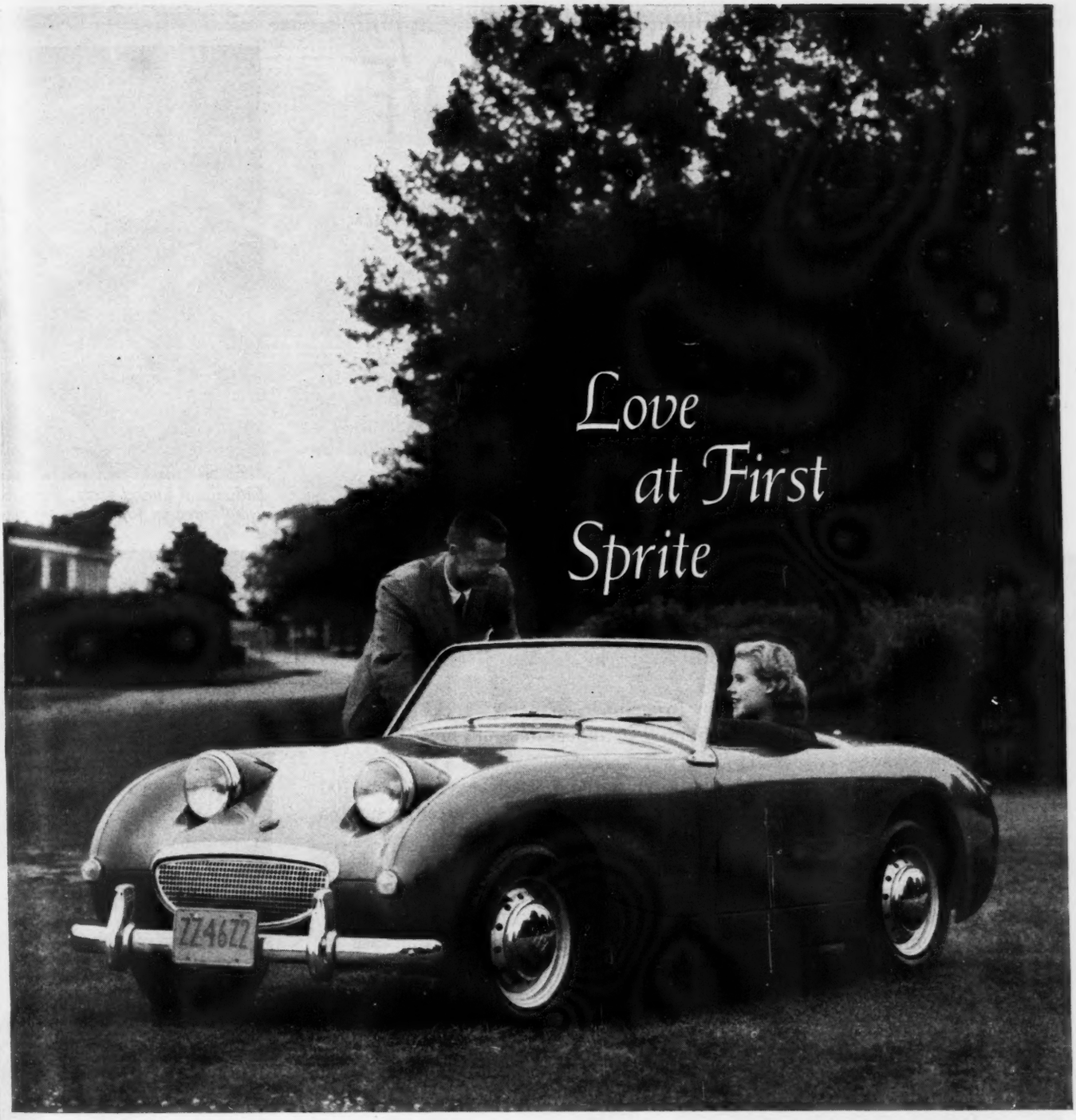


You'll fall head over heels too for this Austin Healey Sprite. A winning beauty — exciting, dashing, quick, responsive. Cleaned up at Sebring. Broke nine International and forty American National Land Speed Records at Wendover, Utah. Top speed, 85 m.p.h. Got everything, but not a bit expensive. The lowest-priced *true* sports car on the market.

Austin Healey sports cars start as low as $1795*

12-month factory warranty on all BMC cars. Literature and overseas delivery information on request.

The AUSTIN HEALEY '3000'. Fabulous successor to the Austin Healey 100-Six which dominated competition in its class. Top speed 115 m.p.h. (2 or 4 seater).

Products of **THE BRITISH MOTOR CORPORATION, LTD.**, makers of Austin Healey, Austin, MG, Magnette, Morris and Riley cars. Represented in the United States by HAMBRO AUTOMOTIVE CORPORATION, Dept. 47, 27 W. 57th Street, New York 19, N. Y. Sold and serviced in North America by over 1000 distributors and dealers.

*Suggested retail price at p.o.e.

The Chrysler 300/F

An impressive demonstration of Chrysler Corporation engineering in one of the world's finest high-performance automobiles

The first Chrysler 300 was built as an experimental model with some of the most advanced ideas of Chrysler Corporation engineers. Professional test drivers were so impressed by the way it drove that Chrysler decided to make a few available.

This is not a car for the average motorist regardless of his means.

It is a car for the man who loves to drive and drives exceptionally well. For the mature, experienced driver who wants far more in the way of performance and handling than he can find in any production car no matter the price.

The 300F compares favorably with the most costly European Gran Turismo automobiles in its ability to maintain very high average speeds over any type of road—rough or smooth, flat or hilly, straight or twisted with hairpin curves.

But unlike cars designed primarily for competition, the Chrysler 300F is a comfortable, spacious car, quite distinctive in appearance and most luxurious in its appointments.

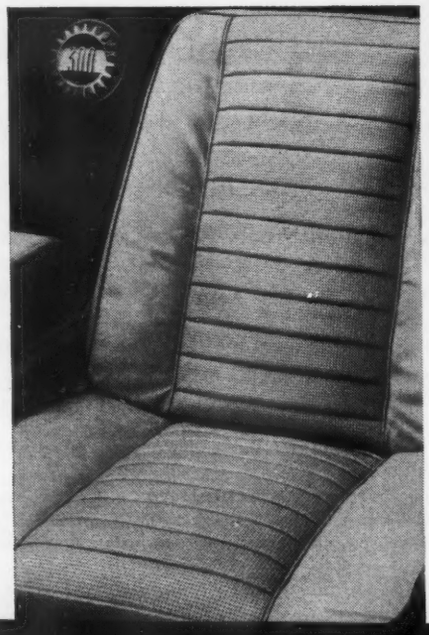
It is not unusual for one of these superb automobiles to cover 600 or 700 miles between morning and dusk. Owners report less fatigue after such trips than at the end of a trip of half that distance in other expensive cars.

300's have an impressive history of record-setting performance on some of the world's toughest courses, yet they handle with an ease and a sense of security unequalled in modern automobiles.

And remember, many of the features, the rugged quality, the ease of handling found in the 300F are engineered into every automobile made by Chrysler Corporation. Try the one that fits you best. Let a drive bring out the difference great engineering makes.

Individual bucket seats, front and [illegible] upholstered in top grain porous le[illegible]

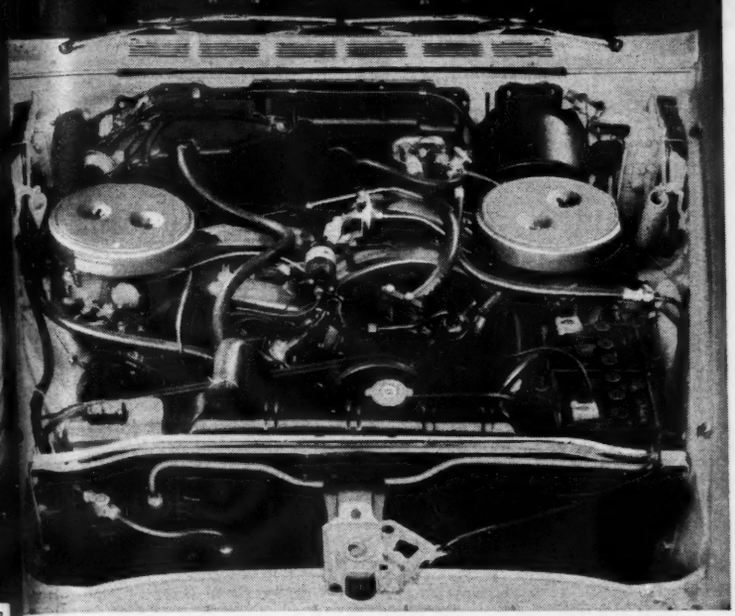
A tachometer shows engine rpm's to tell you when you approach or pass peak performance efficiency.



Bucket seat is designed to give comfortable support from shoulder to knee.

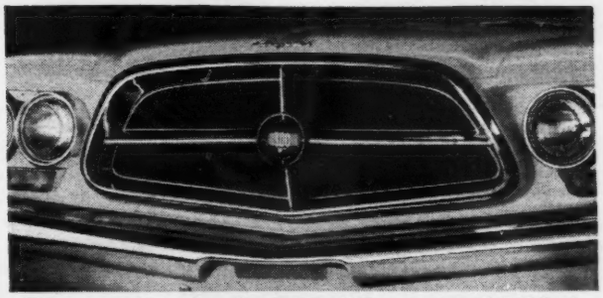
Basic specifications of engine-transmission sy[illegible]

Piston displacement	413 cu. in.
Bore and stroke	4.18" x 3.75"
Compression ratio	10.1 to 1
Carburetor	2 with 4 barrels each
Horsepower	375 at 5000 rpm (400 at 5200 rpm with [illegible] 4-speed manual transm[illegible]
Torque, lb-ft.	495 at 2800 rpm

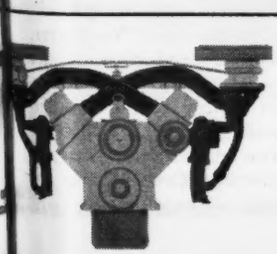


ere's what gives this car its remarkable performance. 375-horsepower
m Induction engine with twin 4-barrel carburetors.

The 300F medallion is molded like a gear wheel to express the rugged spirit of the car.



The open grille gives the 300F a "Pure automobile" look.



Pure automobile...The Quick, the Strong, and the Quiet

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MAGNIFICENT FULL COLOR 20"x 29" POSTERS

Three beautiful posters representing Mercedes-Benz victories in the late thirties. These colorful dramatic posters are practically historical documents, since they deal with the greatest period of motor racing history, Formula One events from 1937-1939. These posters are vividly colored classics of graphic art, startling and brilliant. Three famous races are recorded here, the famous Grand Prix of Belgium, with the magnificent M-163 featured in an exciting sketch, the Grand Prix of Tripoli in 1939, showing the incredible M-165, and the fabulous Grand Prix of Monaco, in 1937. Featured here is the never to be forgotten M-125 with its 600 horsepower engine.

P-1 **$10.00 THE SET**

Two brilliant colored posters of famous races. An explosively bright and simple poster of the "Monte Carlo of the West", the Grand Prix of Cuba of 1957, and a typically British poster for the British Grand Prix of 1958, in which all the information required by any prospective spectator is neatly arranged in varying colors.

P-2 **$5.95 THE SET**

Two fine posters from England; the first announcing an exciting day's racing at Brands Hatch. In startling black, green and yellow. The second announcing the famous Whit-Monday meeting at the BARC's Goodwood Circuit, well known as the hotbed of budding British drivers.

P-3 **$5.95 THE SET**

SUPERB STEREO TAPES PRODUCED EXCLUSIVELY FOR FORMULA I FROM RIVERSIDE RECORDS MASTER TAPES

Available for the first time, SOUNDS OF SEBRING 1959 is Riverside's famous annual report of this classic race, featuring hourly reports of this now historical rain soaked event of 1959, as well as interviews with all the famous drivers—Bonnier, von Trips, Hill, Cunningham, Gurney, Allison and others.

A4T1 **$12.50**

SPORTS CARS AT SEBRING IN STEREO is a tape of pure sound which features all the famous cars which were at Sebring in 1959, including Ferraris, Aston Martins, RSK Porsches, Elvas, O.S.C.A.'s, Arnolt Bristols, Maseratis and many others.

A4T2 **$12.50**

Please ship me the following items postpaid. I enclose $_____. I understand no C.O.D.

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DETROIT NEWSLETTER

by Mike Davis

L. L. (Tex) Colbert's elevation to chairman of the board — while remaining chief executive officer — at Chrysler Corp. came as quite a surprise to all but the real insiders in Detroit.

Chrysler lost money in 1958 and 1959, has seen its share of the market plummet from better than 20 percent in the first post-war years to about half that. So for several weeks preceding Chrysler's annual meeting in April, rumors floated around the auto industry that the hearty Tall Texan would be booted either out or up.

What the detractors failed to take into account was that Colbert has completely rebuilt Chrysler since he took over as president in November 1950. It's the best example we can note of the critics being unable to see the forest for the trees. Under Colbert's management, Chrysler has:

1. Put in an entirely new, and young management team from top to bottom.

2. Almost completely rebuilt the physical property — the new assembly plants at St. Louis, Newark and Los Angeles; two new engine plants; six giant service training centers; numerous supplier plants; the Chelsea proving grounds; and a separate plant for Imperial and unibody facilities for all the rest.

3. Cut the apron strings that tied it to crucial suppliers — Chrysler now has its own glass plant so that it is not solely dependent on Pittsburgh Plate Glass (whose strike last year shut Chrysler down for weeks); bought out the auto body building facilities of the Briggs Mfg. Co.; begun manufacturing generators, coils and starters in its own plant rather than buying them all from Auto-Lite.

4. Bought its way into the World Market with a 25 percent slice of Simca of France.

5. Overhauled its labor relations to insure better cost control, quality and uninterrupted production.

6. Straightened out a confused marketing set-up — too many Plymouth franchises — and introduced successfully two brand-new cars, the Valiant and the Dart.

Chrysler's top management — and some Detroit observers — are now convinced the weakest member of the Big Three is now armed for war, and its rising market share (better than 15 percent) so far this year seems to bear them out.

CORVAIR MONZA — COLE'S GT

As we predicted in the April Newsletter, Chevrolet has made a production model out of the spruced-up Corvair Monza coupe which it introduced at the Chicago Auto Show in January.

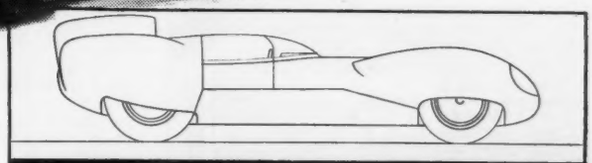
The move came a little sooner than expected — perhaps because Corvair sales are

(Continued on page 14)

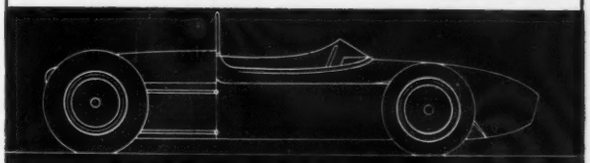
LOTUS

LOTUS ELITE
1216c.c.
GRAND TOURING CAR

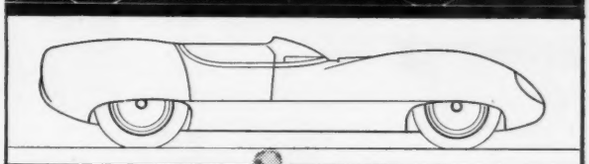
LOTUS FIFTEEN
1500 OR 2000c.c.
SPORTS-RACING CAR



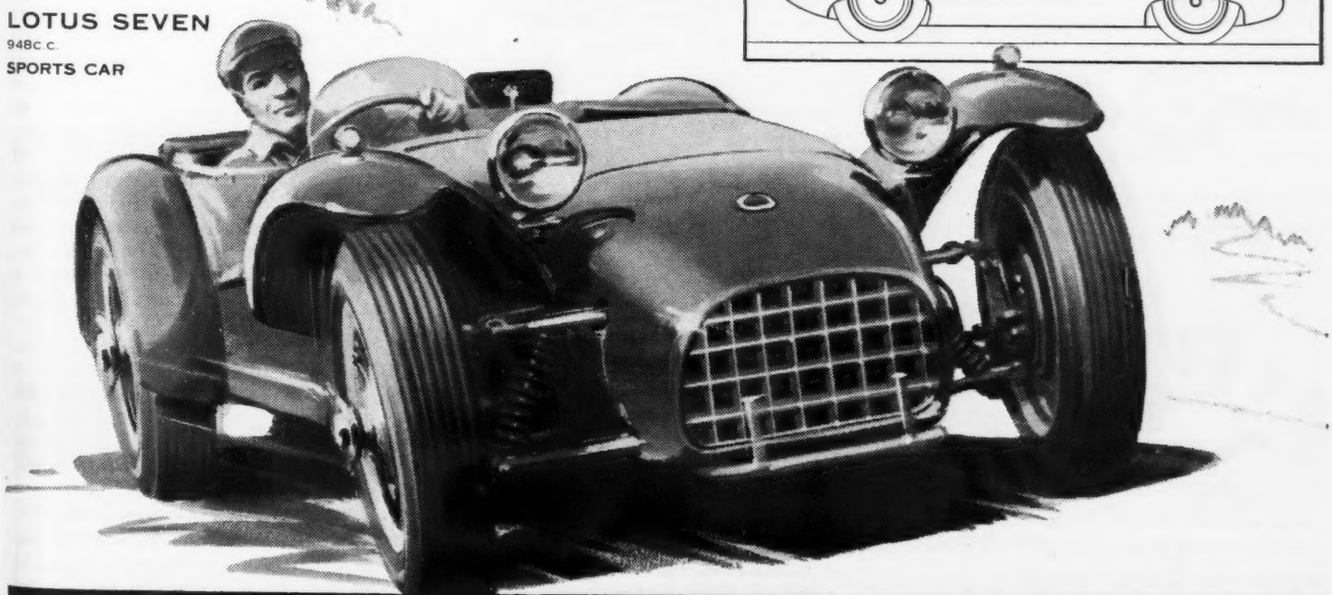
LOTUS JUNIOR
SINGLE-SEATER
INTERNATIONAL FORMULA CAR



LOTUS SEVENTEEN
750 OR 1100c.c.
SPORTS-RACING CAR



LOTUS SEVEN
948c.c.
SPORTS CAR



JAY CHAMBERLAIN AUTOMOTIVE INC.,
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NORTH HOLLYWOOD, CALIFORNIA.

SUBURBAN FOREIGN CAR SERVICE INC.,
SUSQUEHANNA ROAD AT OLD YORK ROAD,
ABINGTON, PENNSYLVANIA

LOTUS CARS OF AMERICA
4110 LANKERSHIM BOULEVARD
NO. HOLLYWOOD, CALIFORNIA

GET THEM WHILE IT'S HOT!

or VACATIONS Can Be Fun by Marion Weber

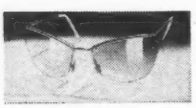
Hi, there! Are you marking off the days on your calendar until Vacation? Are you listening with envy when the gang gathers around the water cooler to those fortunates who spent two weeks water skiing in Bermuda or fingering poi at Waikiki? If so, just remember; your sports car trip will make their adventures sound like staying home and watching TV. First, of course, you want to get a jacket patch (or several patches) and sew neatly on your attire (jacket, shirt, coveralls, shorts, etc.). This does two things: First, it makes it easy to remember what kind of car you are driving should you park it in a big lot or want to buy spare parts; Second, it impresses the natives in remote areas who will think you are at least a member of the factory team. MG Mitten has colorful embroidered patches for nearly every known make of sports car (including Lotus and Aston Martin), exact duplicates in true colors of the insignia plus national emblems, "Racing Team", crossed flags, etc. Send $1.00 for each emblem, postpaid.

And, speaking of postpaid; a newly re-organized shipping department has effected some economies and we are going to accept Uncle Sam's postal bite on your behalf.

POSTPAID
MG Mitten pays postage on all items except very heavy objects such as grille guards and luggage racks and C.O.D. orders.

On your trip you will be parking in some strange places, often in contact with big cars. Get a grille guard and be sure. Install it yourself in minutes.

MGA Grille Guard $17.95
Bumper and grille guards for most sports cars are available, write for free catalog.



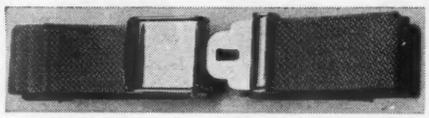
Specially treated lenses of these night driving glasses reduce glare from blue end of spectrum, kill dazzle. Light, comfortable, efficient **$3.50**
Clip on (over glasses) style **$2.50**

Summer driving calls for correct tire pressures. Check yours frequently with an accurate gage.
Drager de luxe (shown) **$6.50**
Messko gage .**$2.95**

Add to the capacity of your luggage boot with an attractive rack. Take your pick from all-steel chrome plated permanent or detachable types or the beautiful AE hardwood slat rack which is illustrated. Lightweight Aluminum, sturdy, fits sunroof models too! Quickly detachable. Please specify make, year, model and style of rack. Permanent racks bolt to deck lid, detachable sit firmly on large neoprene suction cups. Your choice **$19.95**

VOLKSWAGEN ROOF RACK: Designed for MGA, Healey, Triumph. **$14.95**

OCTOPUS baggage strap eliminates rope & string .**$2.95**

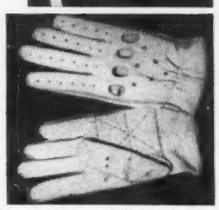


You certainly don't want to venture out of town without the protection offered by a good lap strap; Black, red, blue, gray or green nylon web with metal-to-metal buckle, adjustable slip-grip.

5,000 lb. test belt .....**$9.95 EA.**
6,000 lb. test belt .....**$10.95 EA.**

Glamorous straw hat with deep dish brim is ideal for open car and sun. Natural straw with red or aqua streamers that tie under chin or biege straw with coffee, black straw with white streamers. Sharp! Only **$3.95**

European-style Corduroy caps are good looking enough to be worn anywhere, substantial enough to take a beating, stuffing in pocket, etc. Regular $5.00 value now just $3.50. Choice of Black, Red, Silver, Green **$3.50**



You should never leave the garage without driving gloves. The difference in driving comfort, even for short trips, will amaze you. Choose from all-capeskin Grand Prix model with gathered wrist, inset thumb, double palm and vented backs or Les Leston model with cape palm and mesh backs. Both are elegant in appearance and long wearing.

Grand Prix (sizes 6½ to 10) .....**$7.95 PR.**
Les Leston (sizes 7 to 10) .....**$5.95 PR.**

Get a new car lately? If so protect your investment by protecting its appearance. Keep it covered with a Mitten if it sits outside as little as four hours a day. Easy on and off, stays snug. Does a money-making job. Ask for details on cars not listed.

	Lightweight Sun and Dust Cover	DURICON Water Repellent
☐ MG Mitten ☐ Healey Hugger ☐ Alfa Apron (Rdstr.) ☐ Fiat Frock (1100TV)	$17.95	$24.50
☐ Morris Muff ☐ Renault Romper ☐ Ghia Gown ☐ Porsche Parka ☐ Peugeot Pegnoir ☐ Minx Muff ☐ Fiat Frock (600) ☐ Saab Sack	$22.95	$29.50
☐ Corvette Cap ☐ Thunderbird Topee ☐ Jaguar Jacket (140, 150, 3.4) ☐ Mercedes Muff (190, 300 SL)	$27.95	$32.50
☐ Volvo Vest ☐ Vest for Volkswagen	$22.95	$29.50

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Catalina Station, Pasadena, Calif.

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SEND POSTCARD FOR FREE ENTHUSIAST'S CATALOG

(Continued from page 12)

being threatened by Valiant — but the package should have great appeal. Essentially, the Monza offers fancy upholstery and more trim inside and out, plus bucket seats. Cost is about $275 more than the standard Corvair 700 coupe.

The Corvair 95-horsepower engine option is also finally going into production, although the excellent four-speed stick box has not so far. (Ford, as you know, dropped the Falcon high performance option even before it was *officially* announced, but the Valiant Hyper-Pack is available through dealers.)

We test-drove a Corvair 700 coupe with both the 95 bhp engine and the four-speed box. Compared to the standard job with a three-speed unit, it is different as night from day. The gear ratios seem just right; changing gears was effortless and flexible — the throw from second to third being shorter than the first-second on the three-speed; with the added oomph in the powerplant, it was possible to drop down to second for a brief stop without strain.

FOUR "MEDIUM-PRICED" CARS

An evaluation of four medium-priced cars (i.e., between $3,000 and $6,000) almost inevitably falls into a consideration of their extra-cost options.

We tried out — in varying degree — a Chrysler New Yorker, Buick Electra, Mercury Montclair and Oldsmobile Dynamic 88. All are good cars, quite possibly the best their makers have put out in a number of years.

Each has its forte, in our opinion: the New Yorker, far and away the best road car; the Electra, lushest interior and, among GM cars, best seating; the Montclair, best front seat space and, all-round, a most pleasing car to drive in town or country; the 88, a masterpiece of simplicity and workmanship.

If we had a common complaint, it would be over-extended dimensions. Except for the Thunderbird, U.S. cars in this price class are simply too big. A common praise would be comfort and quiet.

The Chrysler, Buick and Olds (as well as Cadillac) have one feature which we think detracts from safety: the absence of a horn ring. Time was when you had to pay extra to get a horn ring; now you have to shell out not to. At any rate, none of the horns in the cars named can be blown by hitting the center — you have to keep an eye or a hand on one of the two spokes which contain the horn buttons. And in an emergency, when the wheel is turned, you can't "automatically" find the horn. That's dangerous.

We had more opportunity to try out the New Yorker than the other three, so we'll concentrate on it. The car came equipped with everything but a beer tap: air conditioning, auto-pilot, swivel seats, automatic mirror and headlight dimmer, "full power" as they say on the used car lots.

It is hard to imagine more comfortable, effortless long-distance driving than is possible in a Chrysler so-equipped. Night or day, all you do is steer. To the purists, this sounds like heresy; to them, all we can say is: try it.

You set your speed on the auto-pilot, engage it, and you are immediately re-

(Continued on page 16)

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☐ MGA	29.50	*California Residents Add 4% Sales Tax*	

(Continued from page 14)

lieved of a cramped right foot and vigilance for radar traps (assuming you set the auto-pilot close to the limit.)

At night, the lights and mirror dim for approaching cars front and rear. . . . the air conditioning keeps you in perfect comfort. You listen to symphonic music floating in on the radio; if the station doesn't please you, a foot switch actuates the signal-seeking radio. If the station isn't coming in strong enough, another switch raises the aerial. Other gadgets change the interior ventilation, front and rear, top and bottom. The ride is superb.

There are some minor drawbacks to the New Yorker. Because of the many accessories, the instrument panel is an impossible maze. . . . other automakers, like Buick and Olds, have done better in this regard.

Chrysler's swivel seats are, frankly, ridiculous. True, the 1960 models eliminate a complaint about the 59's: that you had to stoop down to swing the seat back in after you got out; now closing the door also swings the seat in. But when the seat is turned, objects on the front seat have a way of falling into the pit underneath, and if you're parked close to another car, it is easier to get out without swiveling the seat.

A better feature would be individually adjustable, reclining seats such as Ramblers — not to mention many imports — offer. We have heard Chrysler may go to something like this.

We took the New Yorker over all kinds of road surfaces for 1,500 miles. There were none that couldn't be crossed at 60 miles per hour or better with complete control, quiet and smoothness. Gasoline mileage ranged from 12 in the city to 15 on the road, with all power-using equipment, including air-conditioning, operating full time. 'Nuff said.

The Buick is an exceedingly easy car to operate. Dynaflow still runs more smoothly than any other transmission. Steering ratio and resistance on all GM's power-steering equipped cars was lowered in 1959 to give better road feel and precision.

Buick has three special features worth mentioning. Most unusual: an automatic head-and-tail-light switch. When engaged, the lights go on automatically when it gets dark, turn off at dawn. Unfortunately (like most such light sensers, including those on competitive products) the electric eye's judgment still isn't on a par with the driver's, and we found ourselves unwittingly leaving the lights on in a dim but not dark parking garage.

The speedometer dial is buried in the dashboard, reversed and facing upward. You see it in a mirror which you can adjust for your own height. All the controls are well-marked.

Finally, Buick, as well as Olds, has a speed warning device rather than a throttle control like the Chrysler. You set the pointer at the desired limit, and Brother! when you pass it, there's no doubt. A buzzer like an old-fashioned electric alarm clock cuts loose and your first thought is to yank the cord from the socket.

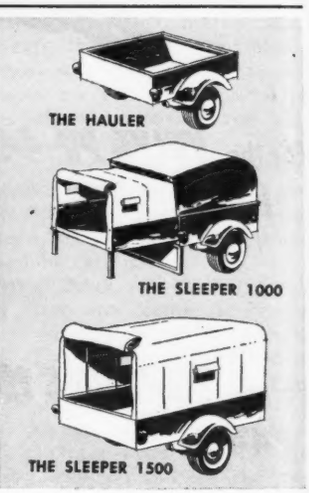
Buick's ride is deceiving: very smooth and level, but oversensitive to expansion joints and with some indication of rear wheel hop over pot holes. Suspension is four coils, with torque-tube drive.

The Mercury feels like an over-grown Ford. This is not to damn with faint praise; an overgrown Ford these days is a *very* good car. You get this impression from the slower steering and engine-transmission characteristics typical of the Ford family. Except for its windshield dog-leg, though, the Mercury is more comfortable and easier to enter than the Ford.

Last year, Mercury moved the transmission hump and instrument panel forward (something like the '49 and later Chryslers), so you get a maximum of space. Sitting in the front seat is like stretching out on the living room couch. . . . you can even cross your legs without barking a shin. The only drawback is you need an arm twice as long to reach the radio.

The enormous windshield wipers sweep more glass clean than on any big car. And if the car is equipped with power seats, the control is on the instrument panel, where you can note the position you like best on the dial, and immediately turn to it after someone else has been driving the car. The ride is excellent.

The Dynamic 88 is Lansing's economy job . . . it runs fine on regular gas. The simplicity of the interior is easy on the eye and is functional. Quality of workmanship found in the Olds would be hard to match in this country at any price. It's not hard to see how the combination of performance, careful building, reliability and masculine styling has made Olds truly "the engineer's car." —*MD*



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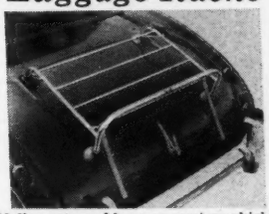

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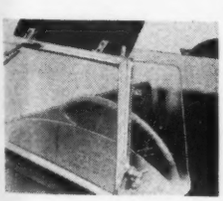

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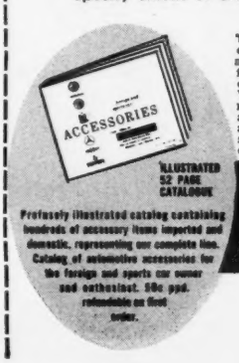
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Here's the "World Series" of drag racing

Officially, it's the "National Championship Drag Races." It's where the hot rodder's proudest title—"Mr. Eliminator"—is earned. Here's a preview of the 1960 National Drags, taken from the 1959 contest in which most of the titles, including "Mr. Eliminator," were won with Champion spark plugs . . .

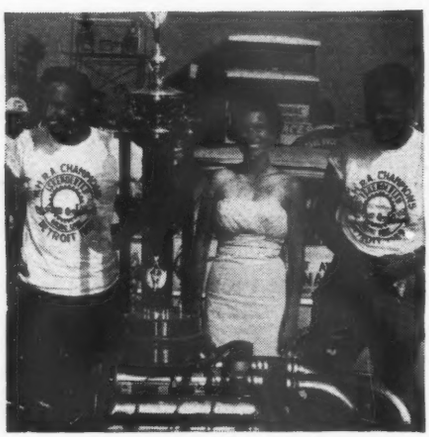
The idea of a drag strip race is simple. It's to see how quickly a car can go from a standing start to a line exactly a quarter of a mile away. Rapid acceleration is far more important than final top speed. Preparing a car to win a drag race is anything but simple. It demands mechanical skill, imaginative engineering, money, and hundreds of hours of work.

Winning takes a smart, skillful driver, too. A drag race is no place for a driver who loves a squealing, slipping start that leaves rubber on the road. That can waste half a second—and victory is usually measured in hundredths of a second.

It's neither a "rich man's sport" nor a "poor man's sport." It's a sport for all who have the necessary qualities of creative imagination, mechanical know-how, manual skill, and the all-important will to work.

To give everyone a chance, there are many classes—for everything from slightly modified stock cars to "dragsters," cars built from the ground up to be nothing but a mechanical quarter horse for that quarter-mile straightaway.

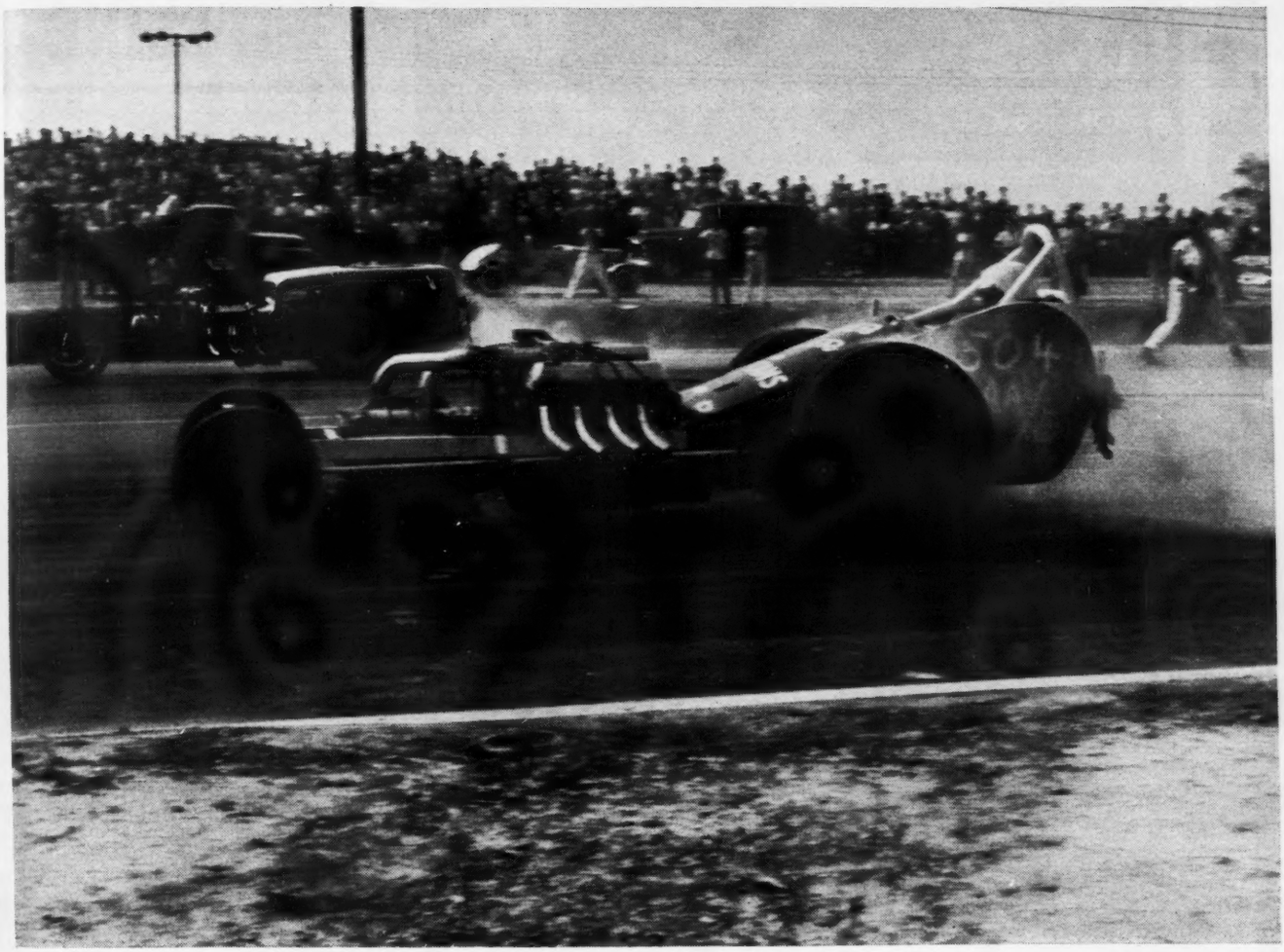
Winners at the National Drags know a lot about squeezing *more* than "maximum" performance from automobile engines. Like engine experts in other fields, most of them—including the Top Eliminator, Middle Eliminator, Sports Eliminator, and Stock Eliminator—choose Champion spark plugs. They know too that every engine does its best with the speed-world's favorite spark plugs—dependable Champions.



Here's the most sought-after of all drag racing trophies—the Champion Spark Plug Trophy—awarded to the Top Eliminator at the National Drags. The winner is decided by a series of two-car elimination runs. Reach the line second and you're out. Left to right: "Mr. Eliminator" of 1959, Rodney Singer of Houston, Texas; Trophy Queen Glynanna Ham; Karol Miller, Co-Owner and Crew Chief of the winning car.

Otis Smith, of Akron, Ohio, wins title of Middle Eliminator in his Class A Roadster with an elapsed time of 10.73 seconds. His Champion-equipped '57 Chrysler mill moves the 1923 Ford body to a top speed of 148.27 mph.

Harold Ramsey of Wilmington, Del. (*second from left*), used Champion J-8's in his '57 Chevrolet, hit 84.11 mph with e.t. of 15.55 seconds to become Stock Eliminator. The '59 National Drags again prove that every engine does its best with Champions.



Rodney Singer's Class AA Dragster takes off on the run that made him Top Eliminator of the National Drags, with the coveted title of "Mr. Eliminator." His Champion-sparked, blown '58 Lincoln engine shot him through the quarter mile in just 9.76 seconds, reaching a top speed of 152 mph!

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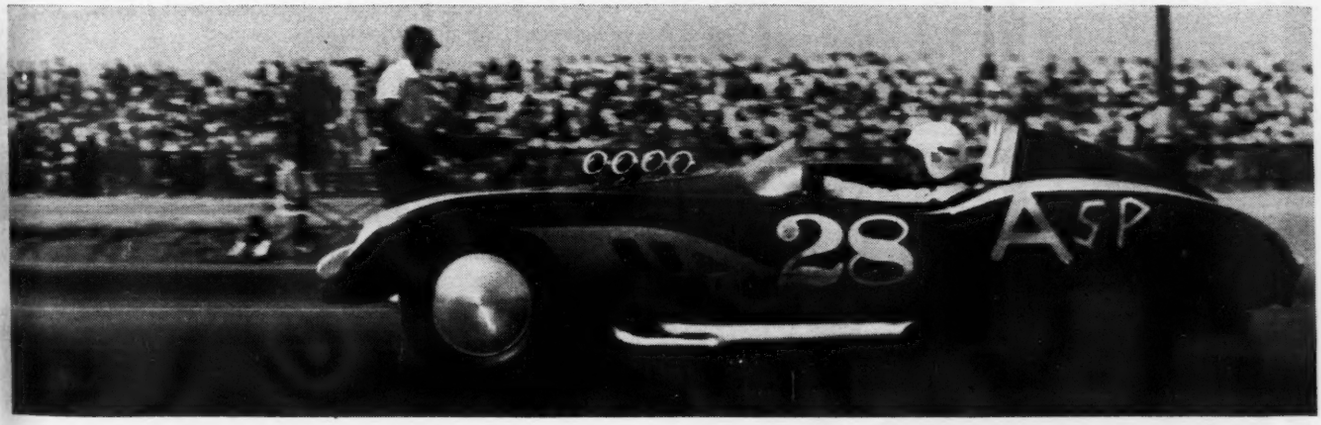

In the new Sports Class, Jack Horsley of Miami, Florida, becomes Sports Eliminator with an e.t. of 12.72 seconds. His speed was not recorded. (In some cases the car with the higher top speed loses, because of poor initial acceleration.) Horsley's 1959 Devin body is powered by a '58 Lincoln mill equipped with Champion spark plugs. Said Horsley, "We used Champions because our experience was disappointing every time we experimented with another make."

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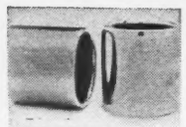

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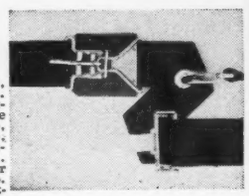

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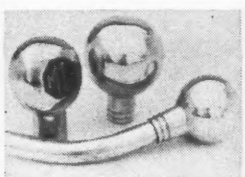

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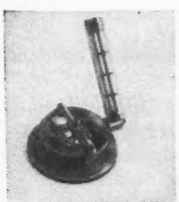

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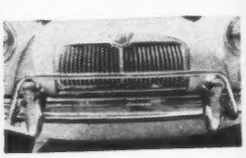

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.....	Uni-Syn 4-bore carb.	12.50
.....	Drager Tire Gauge (Jay's Special)	4.95
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PIPELINE

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A new sealant, Bill Corey Automotive Loctite, promises to end vibration-loosening problems wherever two components are joined together. The material, a pressure-hardening liquid, locks nuts and bolts, studs, pipe or tubing unions, shafts or bearings to a pre-determined torque and is not affected by fuel, solvents, heat or humidity. Loctite in a special automotive grade has an infinite variety of uses in the garage and home workshop. A 50-application kit of sealant and companion cleaner is available for $1.50 postpaid from MG Mitten, Dept. SCI, 1127 E. Green St., Pasadena, California.

OOPS!

In the June Pipeline we really did ourselves proud in the error department. The address for the Thundervettes – that's the club devoted to Thunderbirds (no newer than '57 please) and Corvette owners–you'll remember–is 90-01 Sutphin Blvd. Jamaica, N.Y., and not 90-91 as it appeared. If you wrote to Walter E. Hull for information on the new Louisiana Hilltop Raceway he probably passed your letter on to A. Hardcastle, Jr., whose name we should have printed.

RARA AVIS

A body by Touring, coupled with . . . whose? . . . running gear created this chic four-door. Let us know if you guess which make this prototype represents.

KARTS GO FOR BROKE

Chicago area karting fans will be treated to a reliability – endurance run and International Kart Show at Meadowdale Raceway Aug. 7 through 14.

(*Continued on page 22*)

Don't bet on the horse!

This race started only 3 seconds ago. But it's over already. It will take the racehorse 8 more seconds to reach 40 m.p.h., his top speed. By that time, the TRIUMPH TR-3 will be up around 60 m.p.h. (And in just a few more seconds can reach 110 m.p.h.)

The TR-3 is just about as successful in competition with other automobiles. It has placed first in class in practically every major European rally during the last five years.

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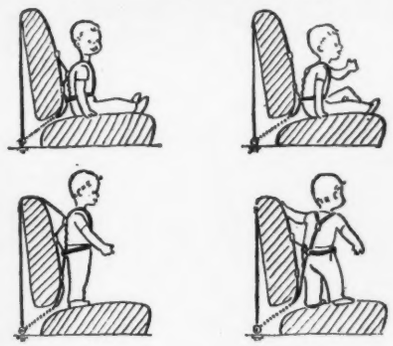
☐ MERCEDES 190 SL

(Continued from page 20)



SUPER SAFE

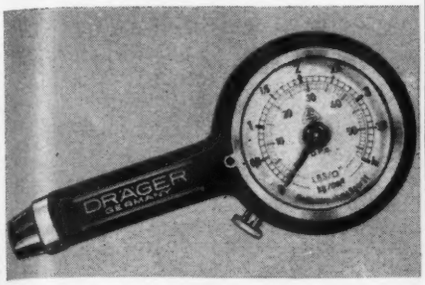
One of the most dangerous situations possible is enacted on the roads day in and day out. The cast of characters includes a young matron and her even younger two-year-old child. The two of them are barreling along some suburban road in the family's down-at-the-wheels second car. Mother's in a rush, having just dropped the oldest boy off at school, put the head of the house on the 9:10 for the city, and checked to see how the repairs on their new car are coming along. With all these things on her mind she is in no condition to cope with an active young baby and a moving car, two tasks that usually require a person's undivided attention. The miracle in all this is that only a small percentage of the tiny passengers involved in these early morning rides are projectiled through the windshield. The number of needlessly injured children could be drastically reduced if parents would install the automobile safety harness recently developed by New Products Research. Designed by Edward R. Dye, former head of Safety Design Research at Cornell Aeronautical Laboratory, the harness is patterned after those worn by Air Force pilots. Made of strong, lightweight nylon webbing, it supports and takes all shock loads across the child's shoulders and pelvis. The webbing and car seat are anchored to the chassis by aircraft steel control cable. The child may ride sitting, standing or lying down and still receive the full protection from this safety belt. The harness might be adapted for use in a sports car by adults, where it would offer better protection with greater comfort than the regular seat belt. For more information write New Products Research, Dept. SCI Box 166, Orchard Park, New York.

COOL SHADES

Wrap-around sun glasses designed to give maximum protection without obscuring visibility are available from H. L. Purdy, optician, Dept. SCI, 506 Madison Ave., New York City. The glasses feature brown smoke panoramic lenses and cost $15.

VINELAND RACING CARD

The 1960 racing bill at Vineland, New Jersey Speedway will be capped by a national championship event October 15.



USEFUL ACCESSORY

Needless tire wear can be avoided by a regular check of pressures. EMPI, Dept. SCI, Box 668, Riverside 3, California, markets the Drager tire gauge. Finished in black crackle, it has a shatterproof crystal and dial reading in pounds per square inch and kilograms per square centimeter. Accuracy is enhanced by a sliding dial permitting adjustment of the gauge to outside air pressure. Complete with leather case, it costs $4.95.

THE BODY BEAUTIFUL

Hot-rodded sports cars, euphemistically called "specials," are gaining in popularity. They are being seen in increasing numbers at races and even gymkhanas as drivers fall prey to the notion that they can go one better than the factory boys. Unfortunately, while the premise may be correct, the results are often pretty gruesome and the fault often lies with the constructors' failure to "think ahead."

"Sports Car Bodywork," by B. W. Locke, takes backyard Bertones step by step in the process of building a frame and body from scratch, customizing an existing one or restoring an old one. Locke, a member of the British Carriage Manufacturers, presents, in clear, concise language, plans and instructions for building wood or metal-framed bodies and includes lots of pointers to simplify the work and avoid many common snags. There is a full chapter on fiberglass bodies, their construction and mounting.

The only shortcoming we found — and not a serious one — was that the appendices were keyed to the British reader. For example, one lists British construction and use regulations which do not necessarily jibe with states' regulations here. Another contains a fairly comprehensive list of fiberglass body manufacturers, but they are all British. However, in a preface note, it is pointed out that American equipment was not listed because Locke had not had an opportunity to inspect or use it. He noted further equipment and supplies advertised in SCI are in most cases adaptable to projects in the book.

Of interest are six large fold-out sheets of working and detail drawings which are cross-referenced with the liberally-illustrated text. We found the book a well-written gold mine of information for would-be special builders and recommend it as a primer before lifting a torch. "Sports Car Bodywork," the revised, 1960 edition, is available from Robert Bentley, Inc., Dept. SCI, 993 Massachusetts Avenue, Cambridge 38, Mass., at $8.50 a copy.—*HW*

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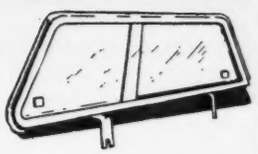

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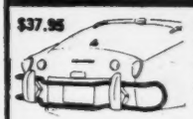

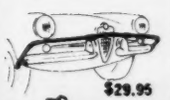

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Volvo 1 outlet (All)	12.50
2 outlet	15.50
VW 1955 on	24.95
Dauphine Dual outlet	15.50
4CV 1 outlet	9.25
2 outlet	10.95
Ford Mk 11 Consul (late)	18.50
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MG TF & TD	13.25
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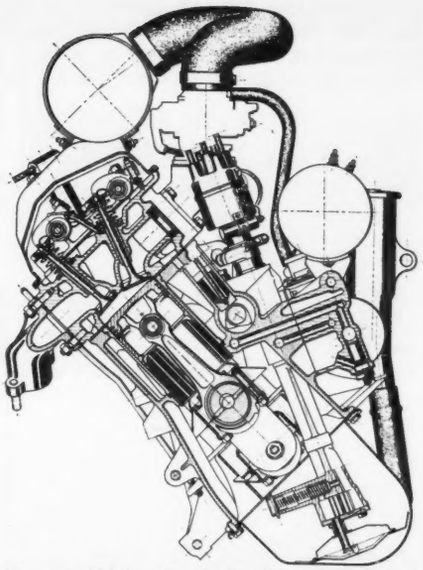
INQUIRIES: If your car is not listed above, airmail us a full description and we will quote by return airmail.

EUROPEAN NEWSLETTER

NEW PEUGEOT

Here's a preview of the new Peugeot, the 404, to whet your appetite for a full technical description in next month's SCI. In addition to a completely revamped body shell, the 404 has technical and interior styling departures from the current 403. Topping the list is the engine, tilted at 45 degrees to starboard, a la Valiant. With four cylinders displacing 1618 cc, it develops 72 bhp (SAE) at 5400 rpm, a boost over the 403's output of 58 bhp at 4900 rpm from a 1468 cc engine. The front suspension has been changed from transverse leaf to coil-shock units.



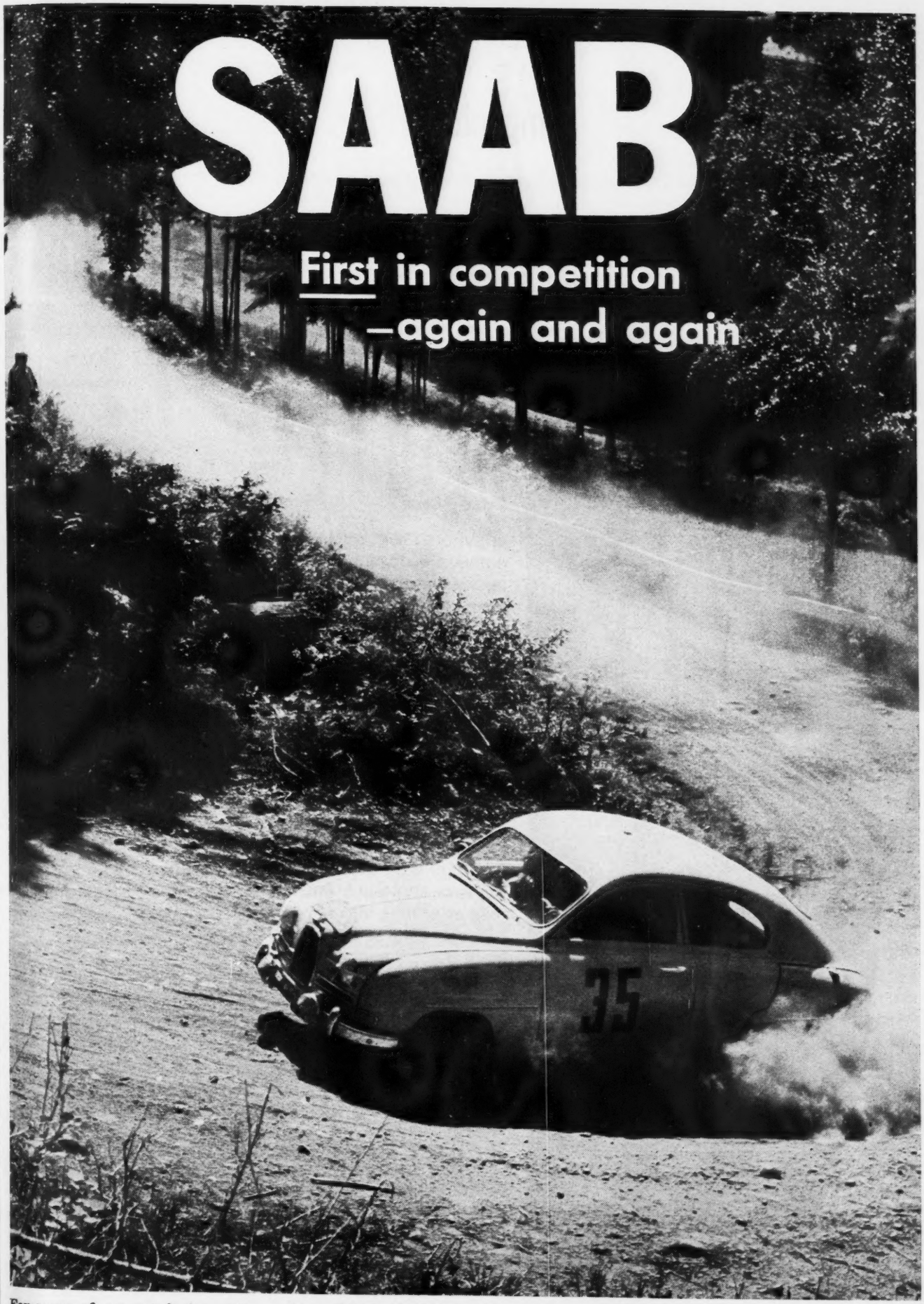
The new 404 is powered by this canted four. It develops 72 bhp from its capacity of 1618 cc.

Long rumored, the Peugeot 404 recently made its debut in France. What a difference one digit makes!

SOME OF THE GAIETY IS GONE

Motor racing is a deadly business. It has also become a serious business. Since the war most of the top ten drivers have been intent, dedicated professional men with personal lives almost devoid of color. They become extraordinary people only when practicing their art. Out of a car, and away from the circuit, most of them assume unassuming attitudes which make them blend into the background. An exception to this rule was Harry Schell. Race statisticians of the future may not rank him among the top ten of his era, but he was well up among this group in the hearts of the tens of thousands of fans that have watched him drive. Handsome, laughing Harry Schell did much to give post-war racing its aura of glamour and excitement. He was one of the few drivers that looked and acted like a Continental race driver both in and out of a race car. Born in America, he lived most of his life in France. All of which gifted him with the greatest boudoir accent since Charles Boyer. Watching Harry in action at some candle-lit bistro was almost as good as seeing him do a group of race officials in the eye using a combination of French, Italian, and Harry Schell English. Harry is dead now. He was killed practicing in a Cooper Formula 1 car at Silverstone. Shortly before his death we received a short bit on Harry's activities at Sebring. At first blush this little story would seem to put Harry in a bad light. If you knew Harry, however, you would realize that this was not the case. He may or may not have cheated. If he did cheat, it was in much the same manner that golf scores are doctored when playing with friends—for you see it was all one, big glorious game to effervescent Harry Schell. It is a pity that he is no longer playing.

Those of you who were at Sebring in December or who read the report of the first American G.P. in SCI, will remember that just before the start of the race Harry Schell was able to convince the timekeepers that they had erred in not crediting him with the right practice time. The ensuing discussion ended by putting Harry onto the front row of the starting grid, replacing Tony Brooks's Ferrari. There has never been a satisfactory explanation as to how Schell was able to make a better practice time than Brooks, the degrees of skill of the two drivers being considerably different, but now certain people (who at the time did not want to make any noise and protest) state that they observed Schell cut the Sebring course practically in half! He apparently dived off the track just before it enters onto the "black top" road circuit, cut straight across to where the road circuit comes back onto the airfield perimeter, waited there for a certain time so that his lap would not be too fast, and then rejoined the route! —*SCI*



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SPORTS CARS ILLUSTRATED
AUGUST 1960

YOU'RE PAYING FOR THESE NEW INTERSTATE HIGHWAYS

by Robert Gorman

The most ambitious road-building program in history, the Federal Interstate Highway System is being financed by each and every U.S. taxpayer. The crucial question is: are your dollars being wasted?

AS HISTORY'S most massive bout of roadbuilding—on what is officially known as our Interstate System of National and Defense Highways—enters its fifth year, the official word out of Washington is a reassuring "on schedule."

But there is a mounting chorus of questions about what that schedule is, what it's likely to be, and what it ought to be. Complaints pour in from communities that have been bisected and from others that have been bypassed. Taxpayers mutter anxiously as cost estimates keep rocketing upward in billion-dollar leaps. And impatient drivers can't help wondering about the kind of programming that produces brilliant patches of roadway running from here to nowhere in tiny, incomplete spurts.

With 4,250 new bridges and overpasses completed (and 6,150 older ones absorbed into the Interstate System) the Defense Department discovers that the standard 14-foot headroom won't permit trucking of missiles and some other large bits of military hardware. There are loud rumbles, too, of waste, profiteering, land speculation, and poor planning. And it is said that many grosser scandals have been swept under our spreading carpets of asphalt and concrete. Some, in fact, are peeking out: allegedly substandard paving on Oklahoma's Skelly Bypass has resulted in several criminal indictments.

Nevertheless, the box score is impressive. Between July, 1956 and February of this year, construction had been completed on 5,900 miles of high-standard freeways, and another 2,250 miles of toll roads had been incorporated into the System. Also as of February, 4,500 miles were under construction or advertised for bidding, and preliminary engineering or right-of-way acquisition was in process on some 19,000 additional miles. By the end of this year, an estimated 9,400 miles of completed Interstate Highways will bring the speed, safety, and pleasure of modern motoring to every part of the country.

Raw figures tell only part of the story. Ultimately, the Interstate System is supposed to be adequate for 1975's mainline speeds and traffic volumes. So its standards, which include control of access and wider rights of way, are much higher than for most other roads. Nearly three-quarters of the system will be built on new locations, and six- or eight-lane divided highways will account for more than one mile in ten. This adds up to a lot more engineering, negotiation, and construction per mile than is revealed by statistical tables.

On the other hand, piecemeal scheduling (which is designed to spread partial benefits as quickly and widely as possible) tends to inflate the figures slightly. Some of the "completed" mileage won't start helping traffic until future connecting links are rolled into place. Other two-lane sections, which are open to traffic and adequate for present needs, have also been included; many of these still have to be paralleled by additional two-laners to satisfy 1975 requirements. *(Continued on page 75)*

YESTERDAY'S HIGHWAYS OF TOMORROW

by Mike Davis

Dramatically displayed at the 1939 World's Fair, G. M.'s predictions for our world of today were strikingly accurate. The big question now is: will they be able to do as well at the upcoming 1964 fair?

Have you ever wondered if dreams come true? Think back . . .

The Time: 1939, summer.

The Place: Flushing Meadows, Long Island.

The Tensions: The Third Reich on the move . . . America just pulling itself out of the deep ditch of the Great Depression.

The Background Music: Benny Goodman and Xavier Cugat.

The State of the Art: Headlights being immersed, streamlined in the fenders . . . gear shift levers disappearing from the floor . . . in Detroit, engineers rushing through changes to accommodate sealed-beam headlights . . . in Lansing, Oldsmobile putting the finishing touches on Hydra-Matic . . . the Merritt Parkway the first superhighway and the Pennsylvania Turnpike gnawing its way eastward from Pittsburgh through the sharp ridges of the Alleghenies.

The Dream: General Motors' Highways and Horizons exhibit at the New York World's Fair. Its name: The America of 1960 . . .

A city and countryside of the future, laid out by the most imaginative and creative city planners, architects and highway engineers. A city of magnificent, gleaming skyscrapers, unmarred by huddling slums. Widely spaced by grassy greenbelts. No narrow, metal-crammed crevices of dirty streets and alleys. Elevated sidewalks. A quarter of a mile up, on parapets and roof tops, landing platforms for autogyros. Nearby, passenger-filled seaplanes landing on the rivers. Accessible airports in neat cartwheel designs, featuring dirigible hangars. Not far away, giant hydro-electric plants to power the metropolis. In the countryside, trees and farms growing laboratory-like under great glass greenhouses.

Interconnecting this idyllic vision, a system of arrow-straight and gently curving many-laned express highways, reminiscent of railroad marshalling yards. Dotted with beetle- and teardrop-shaped autos and trucks, uncongested, swinging on and off enormous cloverleaf-shaped intersections.

Everything new, everything planned to an idealistic precision . . . on reflection perhaps a bit foreboding, frightening. A civilization seemingly independent, and devoid, of man.

Do you remember now? That was the summer you first saw "Union Pacific" and "Goodbye, Mr. Chips." John Steinbeck's "Grapes of Wrath" was also being filmed.

A Harvard student in a red wig won Wellesley's May Day hoop rolling race. The Princeton graduating class voted Petty their "favorite illustrator." In a Biblical land called Jordan, Jews and Arabs were fighting the British. The submarine Squalus sank in 240 feet of water off Portsmouth, New Hampshire, but 33 of the 59 crewmen were saved by a new steel diving bell.

Only a week before Grover Whalen officially opened the $157 million World's Fair on April 30, 1939, it had been announced that scientists had split the uranium atom, creating a discharge of energy. A month later, Wilbur Shaw won the Indianapolis 500 at 115.035 miles per hour. National Broadcasting Company televised a sports event — a college baseball game — for the first time in the U.S.

Chevrolet was advertising "knee action," available on the Master DeLuxe series only. De Soto had a 23-cubic-foot luggage space. The Olds 60 four-door sedan could be delivered in Lansing for $889, "including safety glass, bumpers, bumper guards, spare tire and tube." A Plymouth coupe with an 82-horsepower engine that "combines flashing power with economy" was advertised for $645.

Sixteen million World's Fair visitors flocked to view the $5 million General Motors Futurama exhibit from a conveyor line of moving armchairs. Also on Long Island, homemade rockets were being fired by eccentric hobbyists.

Designed by Norman Bel Geddes, G.M.'s 35,700-square foot exhibit was termed by LIFE magazine "easily the smash hit of the Fair." It consisted mainly of scale models of futuristic cities — looking much like the Ocean side of Miami Beach's Collins Avenue — and a rural terrain of farms and mountains, cris-crossed by expressways.

A topographic display of the Yosemite Valley showed superhighways climbing 4,000 feet in 14 miles, with no grade over four percent. Main express roads had ten lanes — on the outside, four 50 mile-per-hour lanes, then four 75 mph lanes, with two 100 mph lanes on the inside. Conveniently spaced radio towers controlled the speeds of all cars, and

Twenty-one years ago at New York World's Fair, G.M.'s Futurama included a vast scale model of the "Highways and Horizons" of 1960. Biggest intersection crossed six lanes with sixteen.

kept them moving at constant rates. Cloverleaf turnoffs on additional lanes were designed for a 50 mph exit speed. The lanes were all separated in trough-like cross-sections with high curved sides to prevent out-of-control veerings and lighting came from continuous tubes in the curbs.

On such highways, Americans would able to cross the nation in 24 hours, viewers were told. They also learned that the 1960 cars would: have rain-drop styling; be powered

by rear engines, "probably improvements of the Diesel;" be air-conditioned, and cost as low as $200.

How good, how prophetic *was* 1939's hope for 1960? Perhaps it's too early to tell. You have to concede that World War II knocked five, even ten years out of the future. Maybe we should wait until 1965 or 1970, and then tally the score. But let's look at the picture today. A good place to start is right in Detroit, in the shadow of the General Motors Building. Examine the views of the World's Fair cloverleaf and the meeting of John Lodge and Edsel Ford Expressways in Detroit. The similarity is astonishing. In fact, the main difference is the number of lanes. And anyone who tackles the Detroit interchange in any direction at rush hour could only wish there were ten or fourteen lanes, rather than six or eight.

The same pattern of urban expressways is likewise changing the geography of most other U.S. cities. You can now travel, via state-operated tollways, from someplace in Maine to a point west of Chicago virtually without seeing a stoplight or a grade crossing. And the Federal Interstate Highway system is well under way (see page 27).

You have only to look at the massive urban redevelopment programs in Detroit, Chicago, New York and other cities to see Bel Geddes's city of the future taking shape. Gleaming, cloud-reaching high-rise apartments . . . parks . . . careful planning and zoning. Helicopter — not autogyro — decks are in use in numerous cities, though admittedly not as much as one could hope for. Seaplanes, dirigibles and small airports have been ruled out by the speeds demanded by 1960's travelers, jet speeds beyond the imagination of 1939. Atomic power plants — not hydroelectric — are just getting into operation this year to light our cities . . . the mid-morning of a day only dimly dawning 21 years ago.

Cloverleafs are common today, but Detroit's John Lodge and Edsel Ford Expressways also use fast over-and-under ramps. Biggest difference: Post-war costs cut lanes to six or eight.

Farthest off, perhaps, was the World's Fair concept of agriculture in 1960. You have to remember that the 1920's and 1930's were characterized by successive years of poor yields and the dust bowls. Today, thanks not to artificial farms under glass, but to modern farm machinery and techniques developed by agricultural colleges, the nation's farm problem is not too little but too much yield.

What about the cars and the roads? Chevrolet's knee action of 1939 has become Corvair's four-wheel independent suspension of 1960. The Olds 60 has been upped 28 to 38 units and now comes with Hydra-Matic, power steering and power brakes. The Valiant has more trunk space than the 1939 De Soto, but aren't we hearing the same theme of "power with economy" all over again? Prices? Not a very happy topic. Even if you convert the 1939 dollar to 1960 scale, you still can't find that $200 car and scarcely the $645 Plymouth. But wait. Prices have skyrocketed, true. Yet so have incomes and living standards. In 1939, General Motors found a sturdy limb, walked out on it: "The number of motorcars by 1960 may reach from between 35 million to 38 million." In mid-1960, there are better than 60 million cars registered in the U.S. On the roads of 1939, there were only 26 million cars. The higher wages and improved technology that pushed up the cost of automobiles thus have also given more people the buying power to purchase them. And if this has been true for America, many economists foresee the same pattern for Europe. Already you're seeing advertisements in British auto magazines plugging the two-car family.

The fantastic, beyond-prediction increase in the number of cars shows up another — though minor — fallacy of the 1939 exhibit. Nowhere in the wondrous futuristic cities could you find a parking facility. Today, parking is a major urban curse, with the solutions probably draining off funds which otherwise might have been turned to redevelopment of slums or additional lanes for jammed expressways.

We've got our rear-engined car, called the Corvair, and none too soon for the timetable, either. (Yes, I've heard of Dr. Ledwinka and Dr. Porsche, who already had their versions running before 1939, but imported cars were just a polo playboy's avocation then.) We don't know what happened to the "improvement of the Diesel" which was supposed to be a development of the Lanova Cell. But the G.M. Firebird III has a high-efficiency gas turbine mounted in the rear, and the Wankel engine has already been used in an automobile.

Air conditioning in cars is not only with us, it's even becoming commonplace in Southern and Southwestern states where usage is nearly year-round. The rain-drop-shaped car has never made it in Detroit. Instead, the styling trend seems to be toward the elongated wedge or missile shape with fins which actually help directional stability at highway speeds.

That leaves us with the radio-controlled speed lanes on the superhighways. Cost considerations aside, General Motors researchers have demonstrated — first with the Firebird III in 1958, then with a highway communications system in 1959, and most recently in a report to the Society of Automotive Engineers in March — that external control of speed, direction, spacing and warning is practicable.

GM's Auto-Control system, as outlined to the S.A.E., envisions a limited-access highway, with one or more lanes set up in electronic railroad-like block systems. By means of wires embedded in the pavement, external control of steering, speed, spacing and obstacle proximity is accomplished by the interaction of electromagnetism with an in-car computer and existing power steering, power braking and automatic throttle mechanisms. Manually-operated cars could function within the same system, though not necessarily in the same automated lanes.

Researchers at General Motors believe the first step toward this complete system will come with cables buried on either side of turnpike lanes, transmitting warning signals via radio to drivers when the vehicle veers off course. Commercial development and installation of the Auto-Control system depends on both cost-versus-safety considerations and the almost daily advances being made in electronic reliability by our space age scientists and engineers.

You have to concede that 1939's prognostications were surprisingly acute. Will we be able to do as well with today's celestial ambitions for 1980? *—MD*

by Dennis May

Bristow, after only three years on the circuits, has been quoted as saying, "I decided not to pass Brabham." What makes the statement supportable by other Englishmen is that Chris has beaten the World Champion on one occasion. If he can duplicate this feat at will, he may well be the next Number One. That's his aim.

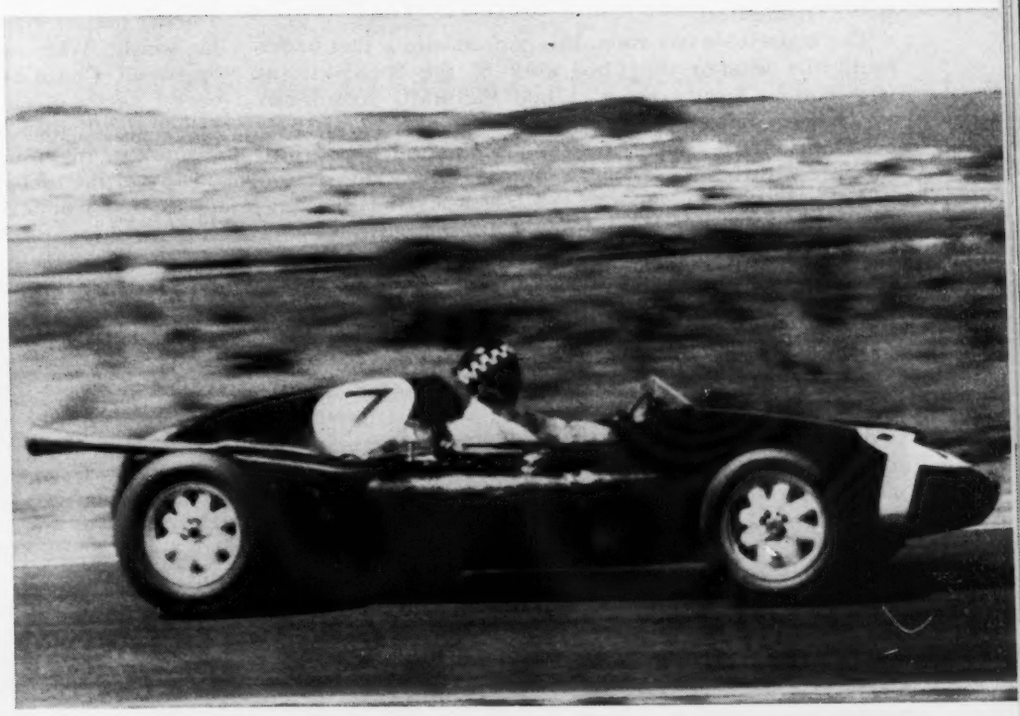
► The fame of Alfred Moss doesn't rest solely on his part in the procreation of the peerless Stirling, and it's debatable whether he or Ken Gregory, his consort in the British Racing Partnership, is the shrewder judge of driver talent. So when these *cognoscenti* picked Chris Bristow out of an abundance of eligibles in June of last year, teaming him with the mature and aggressive Ivor Bueb, two-time Le Mans co-winner, the compliment to the young cockney stuck out a kilometer. They knew he was good; they were pretty sure he could be great. But greatness is something you have to survive to achieve. By way of a reminder of this maxim, Bueb himself was fatally injured at Clermont-Ferrand the fourth time he and Bristow raced together under B.R.P. auspices.

If you could adjust a driver's discretion/valor ratio by vernier, the British Racing Partners would doubtlessly have given Bristow's regulator a tweak in the direction of more discretion the day they signed him on. In the absence of such a device, all they could do was let nature take its course. "Up to the end of last year", Ken Gregory told me, "I doubt if he'd ever felt fear. Then he had that drama at Cape Town in January. I think we'll see a change in him now. Could

(Continued on page 82)

LEADFOOT LONDONER

Bristow and Stirling Moss swap tales of derring-do. Moss seems to be having a chuckle as Bristow tells of bad luck with a "jinxed" talisman.

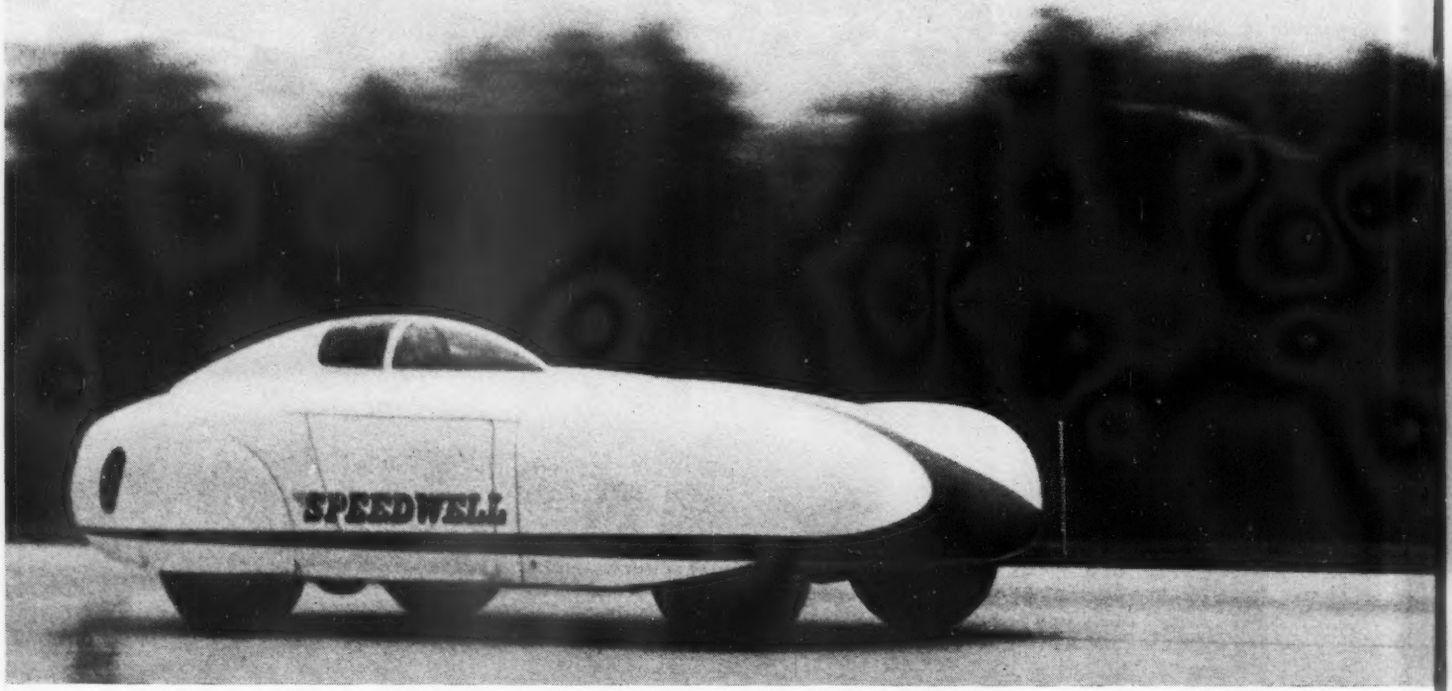


Chris Bristow has made the transition from small sports-racer to Formula 1 car in the short space of three years. Here, he shows a veteran-like calm at the wheel of two different single seaters. The one at the top is the Cooper-Borgward, fielded by the British Racing Partnership, for the John David Trophy last August at Brands Hatch. In two 25-lap heats Bristow bested World Champion Jack Brabham, Brabham's pupil Bruce McLaren, Roy Salvadori, and rapid Graham Hill. Chris (right below) also drove a Formula car for the British Racing Partnership in Africa.

by David Phipps

SPECTACULAR SPRITE

Speed is of the essence to Speedwell, who merged souping and streamlining in the world's fastest Sprite.



The Speedwell Sprite screams down the Antwerp-Liege highway on its way to clocking a neat 132.2 mph. Machine used stock A-H Sprite chassis.

► An unblown Sprite going 132 mph? Unlikely as it may sound, this speed was recently recorded on a Belgian highway by a special-bodied Sprite modified by Speedwell Performance Conversions Ltd., of 763 Finchley Road, London N.W. 11, England.

The remarkable fact about this performance is that underneath the wind-cheating bodywork of the Speedwell car is a normal Sprite chassis. While the BMC record cars which have run on the Utah salt flats in recent years have been specially constructed for the job, this was a car which had been used for everyday transport. It was fitted with special rear bodywork—the front panel is a standard Speedwell production unit—and carefully tuned, and could now be re-converted for street use. The whole project was prompted by the curiosity of the Speedwell directors, who wanted to find out just how fast a Sprite could go.

The story goes back almost two years. Even before the Sprite was introduced to the public, the Speedwell development engineers were studying ways of improving its performance. From their experience of the "A" series engine, as used in the Austin A35 and Morris 1000, they realized that it would be possible to obtain a major increase in power output over the standard 42.5 bhp at 5000 rpm with unimpaired reliability. In the roadholding department, experiments soon showed that under competition conditions a considerable improvement in handling characteristics was provided by the fitting of a front anti-roll bar and special shock absorber valves. But the question of maximum speed remained very closely connected with frontal area and body shape, and to investigate the possibility of improvements in this sphere they decided to consult aerodynamicist Frank Costin, well known for his work on Vanwall, Lotus and Lister racing cars.

Costin's first task was to design a front body section having a better overall shape than the standard hood, while reducing weight. While working on this with George Hulbert of Speedwell, Costin calculated that a special-bodied car based on the height of the "A" engine should be capable of even higher speeds than Ex 179, the supercharged BMC class G record car, in unsupercharged form. The idea seemed attractive at the time, but was shelved as the project was considered too remote from the current line of development.

Then, on completion of the hood and permanent hardtop which convert the Sprite into a sleek Grand Touring car, thoughts were turned to using the prototype hood, in conjunction with a "bubble" top and a Speedwell-converted engine, to see just how fast an otherwise-standard Sprite could go. The chief limiting factor, as far as maximum speed was concerned, was the height of the Sprite cowl, which was retained—together with the standard chassis, running gear and rear bodywork—to avoid undue complication. While George Hulbert concerned himself with such mechanical features as transmission power losses, Frank Costin set to work on the shape of the rear deck, to be fitted on top of the standard rear bodywork by means of countersunk pop-rivets. Aerodynamically it was necessary to increase the area of the body section toward the rear to delay air breakaway, along lines pioneered by Dr. Kamm, and the shape which evolved gave smooth air flow to within ten inches of the tail, with no significant low-pressure areas. The

tail itself was cut off abruptly, as air flow in this area could only be further improved by making the body some 27 feet long.

In cross-section the perspex bubble top was made to correspond with the shape of George Hulbert's head. The slope of the screen was greater than had ever been used before, and as a result it was difficult to make the perspex optically accurate, but eventually a satisfactory degree of visibility was achieved. Due to the angles involved the bubble was made in two halves – pulled over a metal former on a plywood shape – and stuck together transversely. Mounted on the aluminum cockpit cover, it was secured from inside the car by three pull-down fasteners.

Air flow under the car was assisted by a full-length undertray, completely flat except for a small bulge beneath the final drive casing – and discs were fitted on the outside of the wheels. The shrouding of the front wheels restricted steering wheel movement to just one turn from lock to lock, but the light-gauge body panels were designed to bend in an emergency.

Within the car the driving compartment was partitioned off and the passenger space was used to duct out radiator cooling air, the exit being 10 inches from the tail of the car, to coincide with the point of air breakaway. The exhaust system also passed through the passenger space, and had its exit at the same distance from the tail.

As no wind tunnel capable of providing really accurate data on a full-scale car was available, the bodywork was extensively tested on the road, air pressure at various points being measured by means of modified aircraft instruments read by an observer riding as "luggage" in what is normally the trunk of the Sprite!

On a car of this type weight is not a major consideration, except as it affects the time taken to accelerate to maximum speed, but to improve weight distribution and increase under-hood space the battery was moved to the tail. To provide maximum stability at speed the steering geometry was modified and the friction damping on the steering rack was eliminated. The steering column was lowered by fitting a universal joint to bring the wheel rim below the top of the cowl; otherwise it would have been necessary to increase the diameter of the perspex bubble. Brakes were standard, but with special Ferodo linings.

The power unit was the Speedwell "Clubman 70" engine – the most highly developed of the firm's range of production conversions. Hardly a component of these engines escapes modification to some extent, from simple balancing of the rotating parts to the complete redesign of the valve operating gear, which has been the special province of development engineer Dave Jones. Mixture was supplied to the engine by a pair of modified Amal carburetors, again emphasizing the close connection between the high-speed runs in Belgium and the firm's development program for production conversions. All in all, a power output in excess of 80 bhp was available to help the streamlined Sprite on its way. Transmission was by Speedwell close-ratio gears to a standard Sprite axle fitted with the highest available final drive gears, (3.7 to 1) and tires were Dunlop Gold Seal, specially checked and balanced by Dunlop for sustained high speed. Careful attention was paid to bearings and oil seals throughout the transmission and running gear, to reduce friction to a minimum, and Castrol oils and greases were used throughout the car.

Since true maximum speed runs could only be carried out on a closed road, and British authorities are extremely reluctant to fence off even a few miles of their overcrowded highways, it was arranged to take the Sprite to Belgium, where a section of the Antwerp-Liege highway was made available – together with electrical timing equipment – by the Belgian Royal Automobile Club. And while the opportunity presented itself, Speedwell decided to check the maximum speed of its production G.T. Sprite, with aluminum hood and permanent hardtop, as well as a less-highly-tuned version of the "Clubman" engine. The vehicle used was, in fact, a customer's car, raced regularly (and successfully) in sports car events and driven occasionally on the road. There was little time for preparation other than the fitting of standard 4.22 to 1 final-drive gears (4.55 or 4.875 gearing is normally used for racing) but this car was driven to Antwerp, timed at 110.9 mph despite strong crosswinds, and driven back to London a few hours later. 110 mph may not sound particularly impressive, but it represents an increase of nearly 40 percent over the maximum speed of the normal Sprite, and this was with full two-seater bodywork. As for the 132 mph of the streamliner, this represents both good aerodynamics and a lot of horsepower. *–DP*

The Grand Touring version of the Sprite (also by Speedwell) ticked off a record-breaking 110.9 mph. This car was owned by a happy Speedwell customer.

SEVENTH-TIME LUCKY!

Lining up to dust off another opponent, the Bentley/Gordon OSCA charges toward the narrowest Index victory in the race's history — .0006 of a

► When the 10 p.m. checker marked the end of this year's Sebring 12 Hours, a small red car bearing No. 63 zoomed past the finish line, completed a mandatory final lap, then coasted quietly into its pit. A blue-coveralled figure, dirty and weary, brought the machine to a final halt by dragging his left foot along the ground, then stepped out and shook hands with another figure in a red shirt and khaki pants. "No brakes left!" he grinned apologetically.

The pit crew crowded about the two drivers and there was much jubilant hand-shaking and back-slapping. Presently, a champagne cork popped and paper cups appeared. We had been hoarding that bottle of Pol Roget since Christmas! No. 63 was a 746 cc OSCA which had just won the Index of Performance by the narrowest margin in the history of the race, snatching the honors during the final laps from the overall winner — an RS 60 Porsche driven by Gendebien and Herrmann. Oddly enough, no-one seemed to know about it outside our loyal pit crew (whose slide rule proved correct), my co-driver Jack Gordon and myself. Everyone had assumed that the 9:40 p.m. bulletin set the pattern for the finishing order, at a time when we were second on Index by two ten-thousandths of a point and leading Class 5 by eight laps. But when the final IBM results came out at 10:10 p.m., we were actually six ten-thousandths of a point *ahead*.

OSCA No. 63 is about as "standard" as anything Bindo, Ernesto and Alfieri Maserati ever turned out; its basic design concept has changed little since 1956, save that the bore is now two millimeters larger and the stroke four millimeters shorter. This has reduced piston displacement from nearly 749 to under 746 cc, but a new cylinder head derived from the 1100 engine has raised output by five bhp, while peak revs are upped 200. The Morelli body, built at Ferrara, is extremely pretty and — more important — features all the unrealistic and complicated requirements laid down by the F.I.A. for 1960, including a receptacle for a suitcase and a red leatherette folding top with chromed bows. Only change necessary: enlarging the rear window.

Preparation of the car entailed no major mechanical work but consisted of meticulous checking to ensure nothing was loose. The engine had been set up on the factory dyno, so the valves (which have a shim adjustment) were left alone. Ignition advance (eight degrees BTDC static and 30 degrees automatic at 3700 camshaft rpm) was verified and found correct. A Bendix pusher-type fuel pump was installed, controlled by a separate circuit and dashboard switch, but operating through the primary fuel system. A couple of brake drums were removed to check quality and concentricity of the linings. We were uneasy, at first, about the factory-installed bonded Galfer linings and planned to substitute another Italian make, but Bologna told us to leave the linings alone. They would stand up fine. And they certainly did, despite nine or ten hard applications per lap. What we lost late in the race was not the brakes but the pedal. Fluid probably boiled, causing an airlock in the dual system. Bleeding and adjusting the brakes brought the pedal right back up. After 12 hours of hard driving, in fact, only the lining on the left front leading

by John Bentley

PHOTOGRAPHY: TYPOND

Part of the credit rests with fast pit work. In its drive to claim Index trophy, the 746 cc car spent a scant 13 minutes, 12 seconds in the pits.

shoe wore thin. The other three front shoe linings were down only about $\frac{1}{16}$ of an inch; the rear linings were like new!

Another thing that bothered us was the electrical system. Italian generators are not the most reliable, and by the time we installed two additional night driving lights, plus the number recognition lights and usual accessories, the 20-amp. generator was running at a two-amp. overload with everything on. We therefore decided to use the extra beams only through the Esses. In addition, we put in an ammeter and kept two fully-charged spare batteries in the pit, just in case. The car, by the way, arrived without a battery, but after much investigating we found one that was ideal for the OSCA. This was a 12-volt, 34-amp. unit in a compact plastic case only nine inches long, six wide and six high. Manufactured by the Sonnenschein Corporation, this German marvel is standard equipment on the NSU Prinz.

As it turned out we never had the slightest trouble with the electrical equipment or, for that matter, with anything else. It seems, however, that Italians like their drivers small, for neither Jack nor I could get comfortable behind the elegant wood-rimmed steering wheel. Since the seatback was already against the bulkhead, the only alternative was to raise the steering column a good half-inch. Mechanic John Sabiston made up a bracket which provided enough knee clearance, but where he surpassed himself was in the installation of the countersunk spotlight sealed beams. By cutting up a pair of Zerex cans, shaping them to internal body contours and doing some neat welding, he produced a handsome installation, complete with curved plexiglass lenses, shaped by heating and bending on a metal former in the kitchen oven. The air ducts to the front brakes were slightly re-routed, an improvement since they now blow cold air directly into the backing-plate scoops.

No. 63 travelled by trailer to Ocala, where it was unloaded, checked and started, using Champion N3 warm-up plugs. Jack and I then split the last hundred miles into Sebring so we could get acquainted with the machine away from the bustle of practice laps. The moment you slip into the driving seat of this little thoroughbred, you know it was built for business. The seat hugs your hips and back in the right places; brake and gas pedals are ideally positioned for heel-and-toeing; there is room to rest your clutch foot in comfort; steering is a model of accuracy and lightness. The clutch snaps home but is not unduly heavy, though one odd thing you have to get used to is the forward and upward motion of the pedals.

Another detail to remember, (even if you overlook the noise) is that first and second gears of the four-speed box are "crash" type with straight-cut teeth. It is therefore imperative to double-clutch and judge downshifting revs exactly right. If you don't, your mistake can be heard a mile away! OSCA clings to this design because it is simpler, more rugged and lighter. What's more, if a guy can't handle a crash box, they argue, he has no business driving a race car. Anyway, once you get used to this quirk, third-to-second downshifts go in like slicing butter every time.

(Continued on page 88)

TECH AND TRACK REPORT

OSCA 750

by Karl Ludvigsen

► One of the most consistently successful makes of cars in racing over the past decade has been one of the smallest machines from one of the smallest factories: the OSCA. The cars from Bologna only occasionally put in brilliant performances and have often been defeated by more modern, sophisticated sports-racing cars, but in the background there's a steady, impressive record of wins and high placings notched up primarily by private owners. Within this framework one of the most consistently competitive OSCAs has been the superb little 750, whose most recent major win has been reviewed by John Bentley on the preceding two pages.

When the Maserati brothers first visualized a 750 cc car, to be ready for the 1956 season, they saw it as having a space frame of small-diameter tubing, with a rectangular-sectioned U-shaped front crossmember on which the front suspension was to be mounted. This idea was dropped in favor of the perennial OSCA two-tube ladder frame, with one important break from the past. All previous OSCAs had, first, plain semi-elliptic rear suspension and, later, a trailing quarter-elliptic-plus-radius-rod layout much like that now used in the Healey Sprite. The 750 was the first to use the coil-sprung, triple-trailing-arm system that's now employed on all OSCAs (see the tech report on a very special 1100 cc version in SCI, February, 1959).

SQUARE TO OVERSQUARE

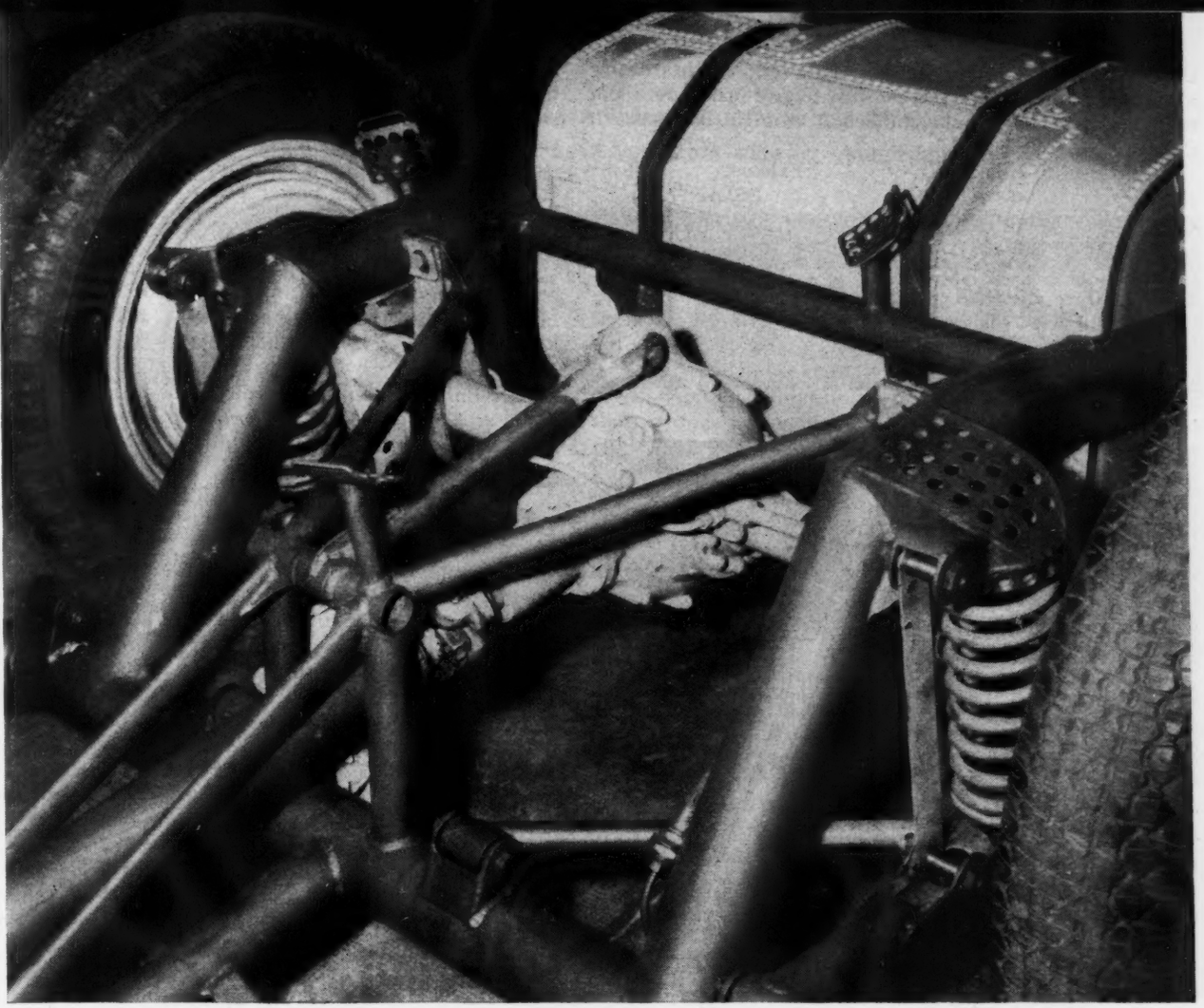
Designated S187, the original 750 cc OSCA engine was and is a beautiful little piece of work, characteristically overdesigned, like the rest of the car, to guarantee reliability and maintenance ease. From 1956 until recently its dimensions had been unchanged (62 x 62 mm), as has been its power output (70 bhp at 7500). Perhaps in response to the pressure that's being applied by Mr. Abarth's very quick twin-cam Fiats, the Maserati brothers have finally given the 750 a complete top-to-bottom redesign, ending up with the car we show here: the type S187N. By OSCA standards this is a revolutionary change, though the difference is far from obvious to a casual glance.

Most fundamental are new dimensions of 64 x 58 mm, producing a displacement of 745.9 cc against 748.7 before. Up at the top the cylinder head has been completely revised, the most obvious change being the relocation of the carbs on the left and the exhaust pipe on the right. This had been done a couple of years ago on the 1500's for the first time, and seems to be beneficial to the exhaust layout and carb linkages. Also, the V-inclined valves are placed at smaller angles to the vertical than they were before, a change which makes it possible to slant the intake ports up a bit more to gain a straighter run for the incoming mixture. In turn this slant has been made practical by a new design of Weber carburetor designated 33DS, which has the customary twin throats cast at an angle to the central float chamber. These very nice new carbs also have a revised top lid with a single circular cover that can be removed to get at all the most-used jet and float components.

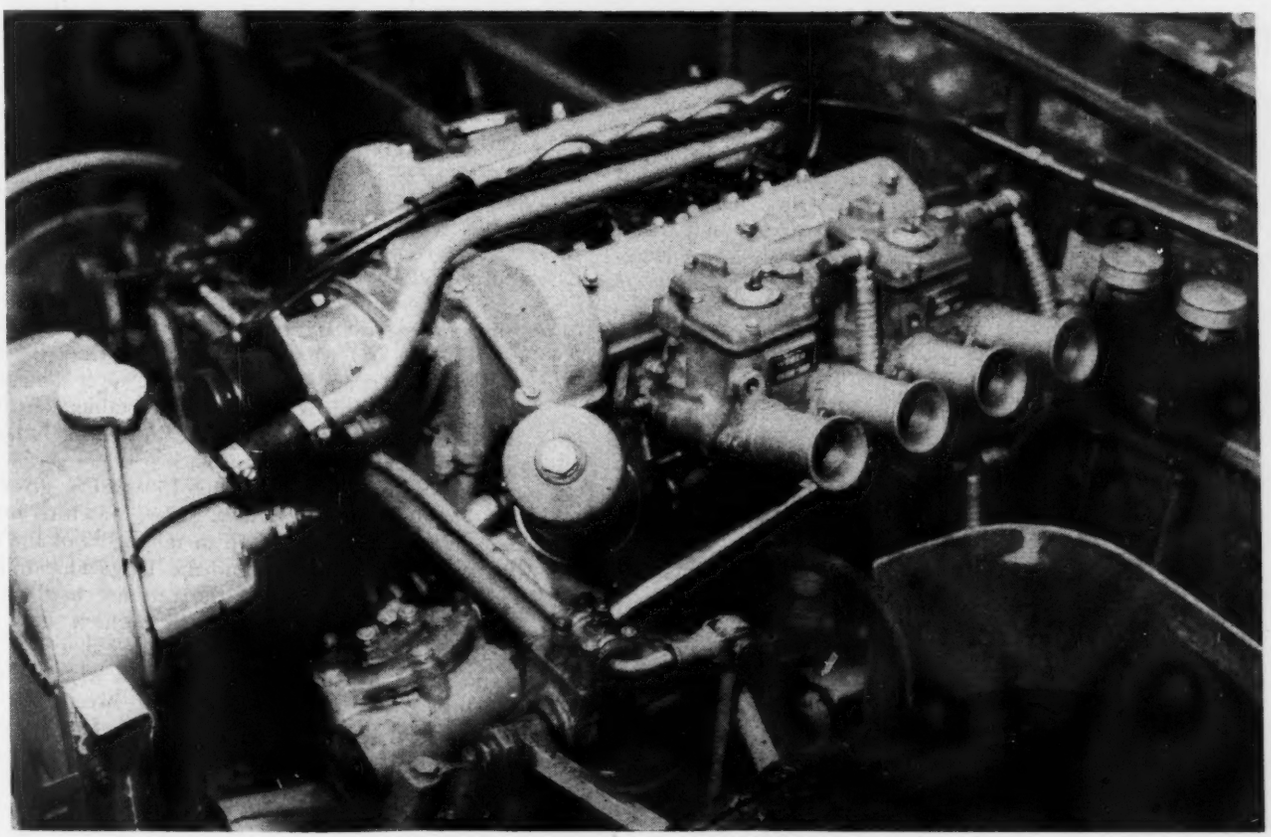
Another change has been in the location of

(*Continued overleaf*)

For a tiny automobile, the OSCA's cockpit is surprisingly comfortable, as the Editor tells John Bentley, above. For Sebring, half-tonneau cover was specially braced and anchored.



The 750's rear suspension, seen above, shows how carefully a "live" rear axle can and should be located in a racing car. Here, during assembly at the factory, the tubular shock absorbers aren't yet in place. Below is the S187N engine, with its completely revised cylinder head layout.



the pivots for the finger-type cam followers, which are now all placed in the central vee, possibly to give maximum room for ports along the sides of the head. As might be expected, the timing is generous:

	Intake	Exhaust
Opens	48° BTDC	75° BBDC
Closes	66° ABDC	31° ATDC
Duration	294°	286°
Overlap	79°	

With compression ratio at 9.5 to 1, the S187N engine delivers 75 bhp at 7700 rpm, and develops its peak torque of 58.6 lb-ft at a very high 6000 rpm. Here are the factory recommendations on rev limits: 7200 through the gears is absolutely safe. Maximum to be sustained for any length of time is 7400 to 7500, while the maximum for short periods is 7700 to 7800. Winding through the gears at Sebring the Bentley/Gordon team saw 8000 frequently with absolutely no difficulty.

Jack Gordon leans on the OSCA's headrest. Clean Morelli-built body has compartment for F.I.A. suitcase in right side, above passenger's knees.

BEHIND THE WHEEL

This was obviously an automobile worth getting better acquainted with, so arrangements were made with George Weaver to take the Sebring-Index-winning car to the new Thompson track for some fast lappery. Thompson was perfect for the OSCA since it's a twisty course that puts a premium on precise handling, but unfortunately it offers no level straights that would allow performance checks to be made.

Since it has a low, simple frame, the 750 can have a genuine door that makes it fairly easy to clamber in and out, while keeping an eye open for easily-bent paneling. Placed very low, the bucket seat is a snug, comfortable fit and offers good lateral support. Thanks to the change made in the steering column height there's adequate thigh space, but the leg room is not exceptionally generous and the pedals are placed high in relation to the very low seat. With the high windshield up close and the half-tonneau cover buttoned in place, it's cozy.

The "office" is laid out strictly for business, with a small-diameter tach at the left, next to dials for oil pressure and water temperature. There's a big cut-out at the center for the stubby, round-knobbed shift lever which is placed well forward, calling for a short reach. Reverse is guarded by a pull-type lockout latch. To fire up the mechanism you press hard on the stiff, short-travel clutch and tug on the starting lever to the right of the shift tower.

CLUTCH IN, AND AWAY

To get rolling the usual non-racing start is made: quickly pop the clutch in at low revs, just a bit above idle, then apply judicious throttle just before the engine stalls. This method is the easiest on drive lines, and is a snap with this OSCA's remarkable engine. Belting off down the track, I found that from 2000 rpm on up the 750 pulls cleanly and steadily. At 4000 it starts to deliver useful power (you wouldn't want to get below that point when racing it), and at 6000 and above it comes to exhilarating life and runs rapidly away, piling rev on rev with furious haste – accompanied by a striving, strident rasp from the exhaust. The sound isn't annoying, since it's away on the right under the car, but it's crisp, clear and reassuring.

Recently SCI has been trying some Fiat-powered Formula Junior cars that offer power peaks much like that of the 750, but the feel is entirely different. In a highly-tuned push-rod Junior you can reach and exceed 6000 rpm but the engine usually feels a hair nervous doing it, with all that monkey-motion thrashing around. In contrast, the thoroughbred twin-cam OSCA feels hard, solid and free no matter how high you spin it, actually biting in and performing best when it *passes* 6000. And remember that our OSCA impressions were gained after the car had traveled for twelve hours at Sebring, with no subsequent attention at all. The initial investment for a car like this is high, but the upkeep should be minimal.

LEARNING THE GEARS

There is effective synchromesh on third and fourth gears, where most cog-swapping is usually done on faster tracks, but the non-synchro second gear takes a bit of learning. Both when coming up from first and going down from third it can be elusive, especially in the latter case when the rather wide shift pattern slows down your approach. But the key to mastery lies in a positive, "you're going in or else" attitude, which the husky-feeling gears seem well able to withstand. Actually after only the shortest acquaintance second gear starts snicking right in, and the rest is easy. With its 5.00 to 1 rear axle ratio, this car was geared just right both for Sebring and for "short courses" like Thompson.

Huge in size for such a small car (it weighs 948 pounds dry) and newly transverse-finned, the brakes are more than up to all demands. Pedal pressure required is lower than on many competition cars, with the new front linings that were fitted just before our trial. Twin fluid reservoirs feed a new master cylinder, which incorporates separate circuits for the front and rear braking systems.

EXCELLENT HANDLING

Now for the best part: taking the OSCA through Thompson's challenging corners. Conditions weren't perfect, with a damp track and Firestone tires with a relatively hard tread compound, but they were good enough for SCI to classify the OSCA as one of the finest-handling cars it has ever tried. First, the steering is quick with a very good lock (turning circle diameter: 33 feet). It has that elusive just-right ratio that provides fingertip lightness without ever making it necessary to remove your hands from the rim for the tightest corners, and transmits a steady, reliable indication of the prevailing "bite" at the front end. The steer characteristic is perfectly neutral, or as near as makes no difference, which means that the car goes where you point it and is absolutely viceless. The throttle pedal can usually be called on to swing the tail into position, depending on how fast you're going and what gear you're in. Does it lean? It may, perhaps on drier surfaces, but I never detected it. Adding all together, this is the most predictable, controllable and utterly sweet-handling car you can possibly imagine – and, as Chevy says, it's *better* than that!

The most lasting impression the 750 OSCA gives is of complete solidity and durability. The Maserati brothers obviously build them to stand up to the rigors of the classic races like the late Mille Miglia and the Targa Florio, leaving a generous safety margin when the cars are used in short club events on smooth tracks. British builders have made lighter cars by paring this margin to suit the track, which is why you never hear of a Lotus or Elva, say, doing anything in the Targa. Its careful, correct breeding from a classic layout gives the OSCA an harmonious feel, a vigorous, competent air. It is without question the finest automobile of its class, and is among the greatest sports cars of the world.

—KEL

A good car deserves accurate instrumentation. Learn how to care for your dash doodads and dials to keep them in good operating condition. It just might save you from blowing your engine higher than a kite.

INSTRUMENT TUNING

by Bill Carroll

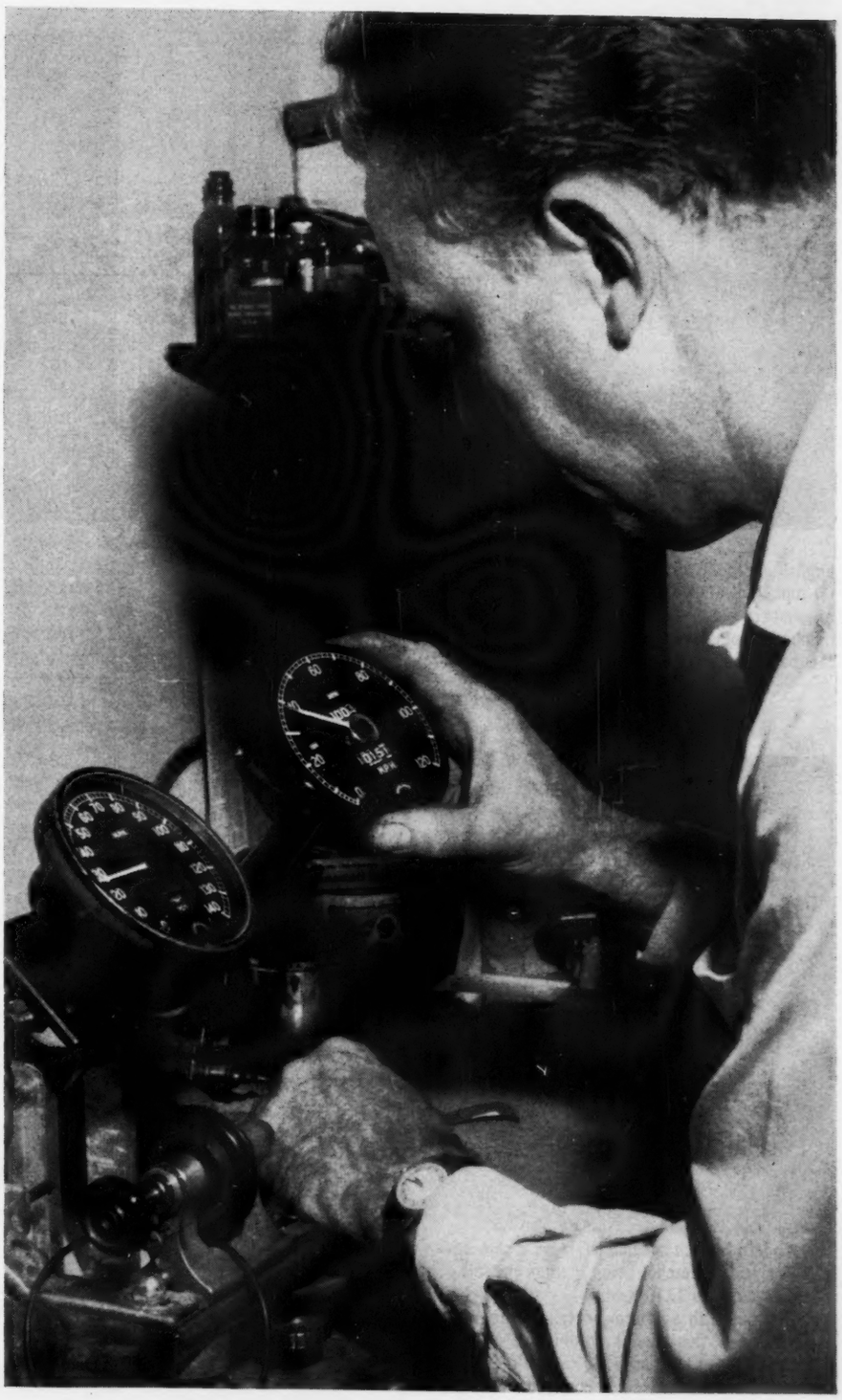
► Tuning instruments for better performance is seldom a part of any rebuilding routine. Engines? Yes! But only when a gauge stops working is the buck spent to get it back in shape. Yet many's the bent rod tossed through a crankcase when a dragging tachometer, indicating some 1000 rpm behind true engine speed, failed to red-line in time to prevent an expensive repair bill.

Jumping speedos are more obvious than those running fast or slow. The aforementioned slow tach dragging its feet is dangerous, while fast needles have you shifting too soon for maximum take-off velocity.

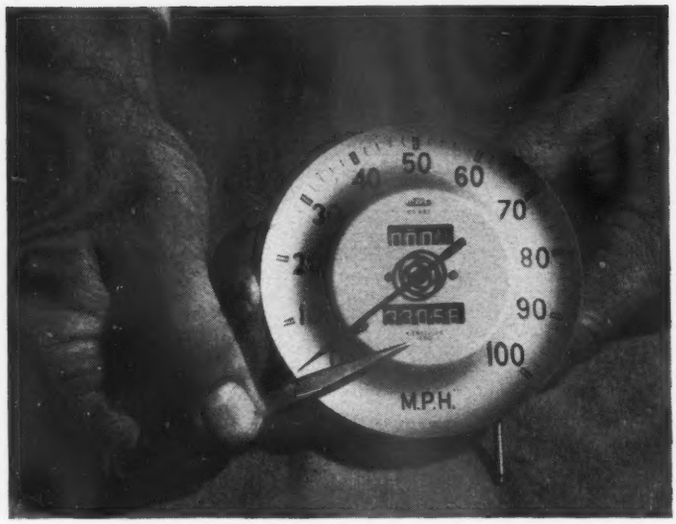
Few cars seem exempt from instrument maintenance. The long, slow-turning speedo cable in a Porsche is subject to shudder and jump. Jaguars are known to pump oil from transmission to clean trousers via the speedometer cable. Renault's long cable often dries and echoes its lack of lubrication throughout the entire car. Differential gear ratios are changed, and speedometers must be changed at the same time. Owners of some current-model German cars have speedometers with a continuously-running tenth-mile dial hidden under the instrument face. Cut a hole and you've another bit of information—almost for free.

One specialist in instrument accuracy is Paul Sullivan of Los Angeles. Speedometers and other instruments from any car you might name have crossed his desk. Sullivan cleans each unit as though it were a fine watch. By adjusting magnet strength and hair spring tension he calibrates the needle, to within one percent, over the entire dial. Following lubrication with instrument oils, Paul dampens each needle to prevent wandering. He returns an instrument more accurate than when it was new. In addition, Paul supplies heavy-duty speedometer cables to reduce needle flutter, rebuilt temperature and fuel gauges, and a unique electrical rally odometer. Paul's odometer slices a mile into 100 parts, and records every one of them for trophy-winning rallyists.

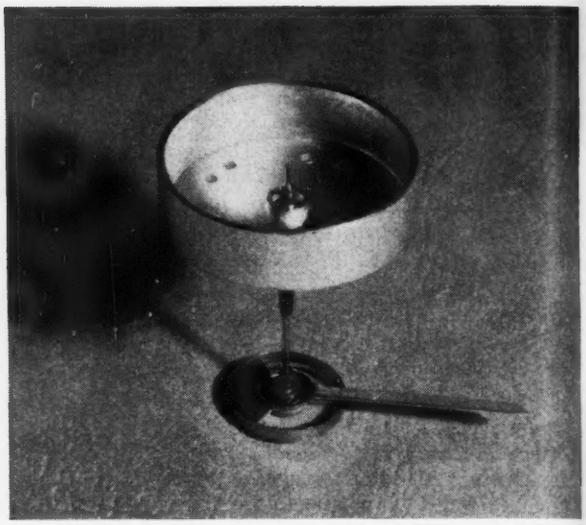
(Continued on next page)



Sullivan uses electro-magnet to pep up the magnet wheel of this German speed-ometer. Wheel is first brought up in strength, then reduced to match the pull of the dial pointer hairspring. Perfect balance between these two forces makes for accurate clock.

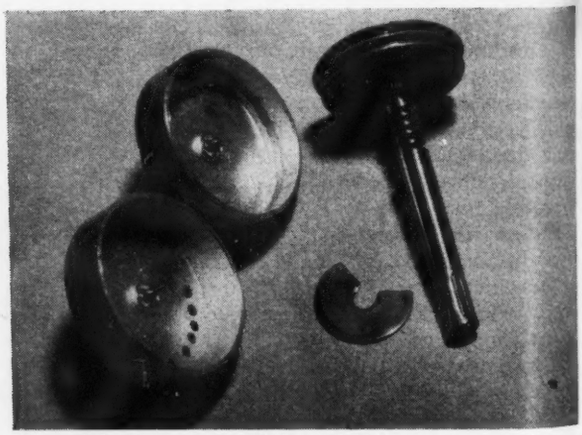


English speedometers have number of cable revolutions at 60 mph indicated on the dial face. Here, on this Jaeger unit the first row of numbers is the model and type, while the 1600 figure is the number of rpms at 60 mph. With this basic information speedometer can be calibrated for any new gear ratio or change in tire size.



This needle and cup assembly is the heart of the speedometer. It is made of aluminum and weighs only a fraction of an ounce. The long pointer is balanced by the pie-shaped piece of metal opposite the needle base, while the cup is drilled for the same purpose. The magnet wheel turning inside the cup pulls the pointer around the dial as speed increases, while hairspring returns it to zero to give an indication of decreasing speed. One trouble spot is the needle point on the center shaft, inside the cup. Wear at this spot causes the pointer to vibrate.

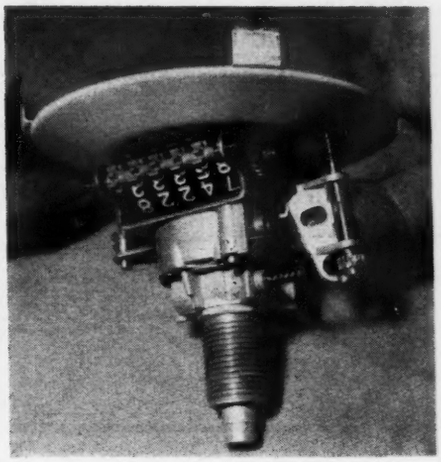
This modern English speedometer has a cam driven off the cable, which moves the ratchet being held on the left. Each time the ratchet moves it pulls the 1/10th wheel a little further around. By changing the wheel for one with a different number of teeth, or changing the cam drive gear, this type of speedometer is matched to car, gear ratio, and type of tires used. It can be recalibrated when any part of the car's drive train is changed.



Worn pointer cup center shaft (upper left) has been ground down to a nub. It will be replaced by new one (lower left). Porsche magnet wheel (right) had the spiral drive (below wheel) forced into the thrust washer, which is almost worn through. Cause was traced to lack of lubrication in the mileage recording wheels, which allowed friction buildup in the drive train. Friction, plus dirt, causes most inaccuracies.

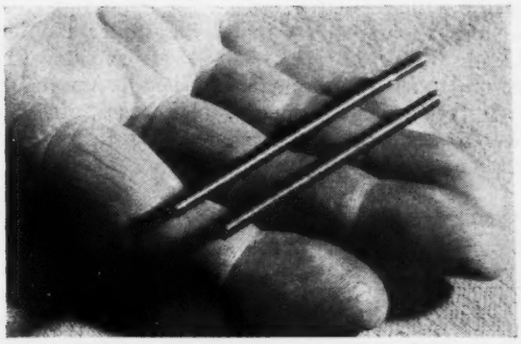
Damping fluid is gently placed in the sleeve bearing in which the pointer shaft rides. The viscous, silicone-base fluid damps out wild swings and shuddering of the pointer from car movement or cable windup.

Instruments from older cars are sometimes better built and more accurate than their modern counterparts. This speedometer from an MG TC has an escapement wheel and hairspring similar to those used in clocks.

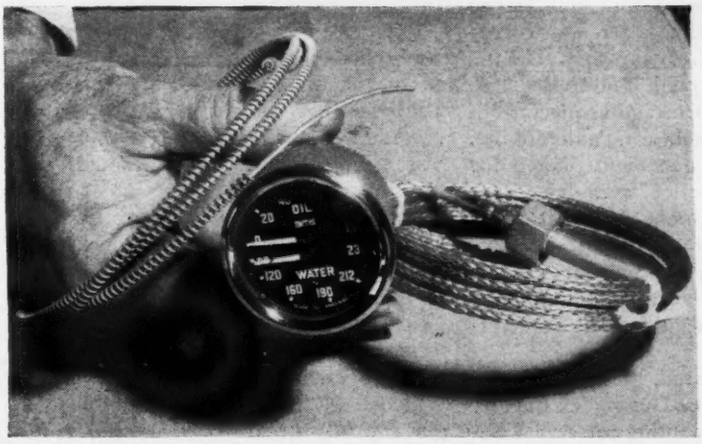


Mileage recording dials on German speedometer are moved by spiral gears. Gears (on finger) are the first to wear in this type of instrument. By varying ratios of the spirals it can be mated to any particular car.

A nylon bushing helps prevent the cable from screwing itself into the speedometer head and putting excessive force on the magnet shaft. This is especially helpful in cars with unusually long instrument cables.



One "secret" of smooth-reading speedometers is use of a heavy-duty cable. The one on the left has twice as many strands as the one on the right. Torsional breaking strength of heavy-duty cable is 18 inch-pounds, as opposed to 13 inch pounds for lighter cable. Speedometers that use an intermittent ratchet movement place a varying load on the cable. This torsional effect is responsible for wide swings of worn instruments.



Rebuilt temperature gauges have capillary tube protected by woven stainless steel braid. This allows greater freedom in routing the cable and insures that instrument accuracy will be retained for a longer period of time.

A reference to a Miller 91 in the results of a bygone race in England proves the clue that helps track down an example of the breed, and the story of a fascinating woman driver.

PROJECT TIME MACHINE
THE MAGIC OF A NAME

by Griff Borgeson

► The name was Gwenda Glubb. I first encountered it in THE AUTOCAR's list of racing records for 1934 as Mrs. G. Stewart. It was the lady's speed, not her name, that attracted attention. On the bumpy, short (1½-mile) Montlhéry Autodrome she had raised the International Class E (1501-2000 cc) mark to an amazing 147.79 mph. Her speed for the flying five miles of 140.17 was only slightly better than Duray's 139.22 in Class F (1101-1500 cc) but, after all, the lady presumably did not have Duray's gigantic strength. The previous record holder, E. A. D. Eldridge, had lapped the Montlhéry oval at only 132.38 . . . in a rear-drive Miller 122. Somehow, with a tiny machine and on a short course, Mrs. G. Stewart had set the absolute World Records for the flying-start 10 miles and the standing-start 100 and 200 kilometers. In this distance range the lady and her mount—the Derby Miller—were the fastest in history.

In 1955 I was in Detroit with a couple of hours to spend before 'plane time. I improved the interval by spending it in the ancient attic that houses the automotive archive of the Detroit Public Library, checking the files of a couple of favorite marques, Voisin and Miller. All I found in the latter was correspondence from J. Blake & Co., Ltd., Engineers, Liverpool, addressed to Cameron Peck, Chicago collector of steam launches and historic automobiles. The May 7, 1947 document offered for sale the Derby Miller front-drive race car with two engines, abundant spare parts, patterns, core boxes, special tools and cutting tools. Pressed for time, I did not read the several pages but shot them on 35 mm film for future reference.

When it appeared, after years of effort, that the ex-Duray, ex-Bugatti SCI Specials were coming my way I began to check out other possible sources of Miller 91 parts. I wrote Blake in an effort to locate the whereabouts of the Derby Miller. Stanley Blake Reece replied promptly on Nov. 28, 1958:

"About four years ago Mr. Bobbie Baird, owner of the Belfast TELEGRAPH, was killed in practice and we had sold the Derby Miller to him a short while before. Actually, we paid about £1000 for it (before devaluation) and sold it for £100 because we had decided to give up handling racing cars."

Mr. Reece suggested I try to contact the Baird estate and I wrote the American Consul in Belfast, Northern Ireland, to this end. Almost simultaneously with a helpful reply to this letter came another from cooperative, enthusiastic Mr. Reece saying, "This arrived yesterday and perhaps gets you a little nearer to locating the famous motor car."

The accompanying letter was on the stationery of The Bull's Head Inn, Shenstone, Staffordshire and was merely signed "Dick." It read, "Dear Stanley: Regarding the Derby Miller, the engine was completely rebuilt by Bobby Baird who, from all accounts, spent a fantastic sum in doing so. It had two sets of cylinder blocks, one 2000 cc and one 1750 cc. They did not realise that the latter was this size and were labouring under the impression that it was 1500 cc. However, when Baird was killed it was bought by a man called McGregor, of Belfast, for, I understand, £20 and he sold it to a man called Stuart Young of Messrs. Weldangrind Ltd., Peterborough Road, Fulham."

A car that still held World Records—and all that equipment—sold for less than the scrap value of the metal! I wrote Weldangrind.

Good friend Peter B. Moore (father is Oscar Moore of British racing fame) wrote from Middlesex:

"Alas! The ex-Gwenda Hawkes Derby Miller is now no longer with us? Due to the keenness of a breaker of such cars called Baird of Belfast? The gentleman in question is now departed as you are no doubt aware. It is not my habit to speak ill of the departed, so . . . extract from AUTOSPORT, March 9, 1951:

" '*Farewell to a Lady*. FWD Derby to be broken up. Below is the last picture to be taken of the historic front-drive Derby Miller which gained countless records at Montlhéry . . . As shown, it was still in good form, although the transmission brakes were no longer effective. The engine will have another lease on life in F.1 events next year, for W. R. Baird of Belfast intends placing it in a tubular chassis with 1100 cc Fiat front suspension and de Dion rear, using an E.N.V. 110 gearbox and two-stage supercharging.'

"Now this report was written before the car was broken, apparently. It is possible that the breaking never took place and that the car was sold via McGregor to Young. Who knows? It was Baird who chopped the ex-Seaman Duesenberg, so it follows that he should do likewise with the Derby Miller. The Duesie came under my gaze in a warehouse in Southall, Middlesex some years ago, complete with Ford or Mercury engine (who cares which) which made it a very valuable heap indeed. What a wonderful Seaman memorial in some museum that car might have been! The Duesie engine went into Baird's Emeryson, out of the Emeryson, up for sale, and now where is it? More to the point, where the hell is the Emeryson?!"

I opened a new line of enquiry. I was deeply enough into the Derby Miller mystery to want to know something definite about the vehicle and the almost anonymous, evidently-Amazonian driver. I wrote the dean of automotive authors, S. C. H. Davis in England; he knows practically all there is worth remembering of European racing in the Twenties and Thirties. Sammy's reply was shattering:

"My dear Borgeson: I have sent you a copy of my book, ATALANTA, which gives all details of Gwenda's exploits.

"She was without doubt the finest woman speedway driver we have had and fully the equal of any man.

"Small, slight, but extremely tough, she could stand up to fantastic difficulties without a worry.

"She began with motorcycle records on Brooklands speedway, then went to France, where she became the absolute champion of Montlhéry speedway near Paris.

"Her father was Major General Sir Frederic Manley Glubb, who distinguished himself for extraordinary courage during the '14-'18 war and was promoted in the field.

"Her brother is the Glubb Pasha who created such a stir a little time ago when he commanded the Arab Legion and he has a whole chestful of worthwhile medals won the hard way.

"Gwenda went out with the ambulance people in Russia for the '14-'18 war and gained the Cross of St. George and the St. Stanislaus medals, both things you do not just get.

"From motorcycles she went to three-wheelers and took the *World's* 24-hour Record on Montlhéry. It may be of interest that I was her co-driver once in this and we blew up after five hours. She had a new engine fitted in an hour and we started all over again, with no sleep, completing the 24 hours entirely due to her amazing toughness.

"Once she averaged 102 mph for an hour on a three-wheel Morgan though it was snowing like hell and so cold that

(Continued on page 92)

Who hath not owned,
with rapture-smitten frame,
The power of grace,
the magic of a name?

—Thomas Campbell (1777-1844)

With nothing to guide them except our first story on Tomorrow's Power, two SCI readers actually built and ran a Wankel engine! Here's how they did it, and how you can too.

HOW TO BUILD A WANKEL ENGINE!

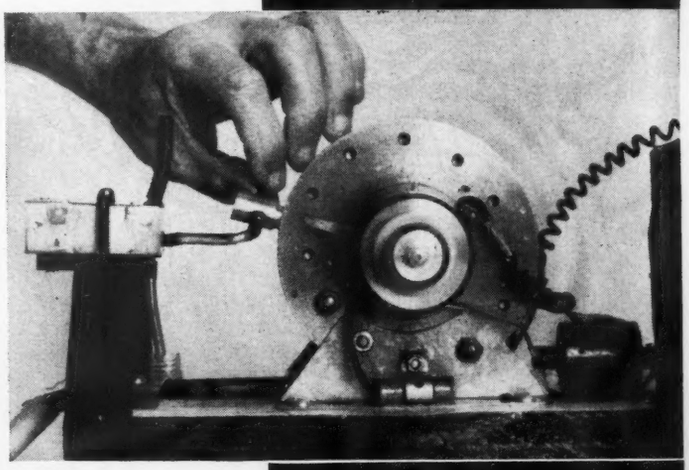
by Stephen F. Wilder

► We've always felt that SCI readers were an active group of people, and this belief has been confirmed in an unforgettable manner by the William T. Thomases, father and son, of Daytona Beach, Florida. It all began with SCI's "Tomorrow Is Here" story in the February 1960 issue, the first major, accurate news break on the NSU-Wankel engine in this country. Another U.S. automotive magazine, while making its first sketchy and ill-informed presentation on the Wankel recently, felt it necessary to remark, ". . . no one has yet explained, to our satisfaction, what is actually happening." This may have been so in their case, but after the Thomases had snipped out the rotor in our February issue to confirm its sophisticated motion, *they* felt they understood what was happening well enough to look at each other and say, "Do you think we can make one, Dad?" "Well, we won't know unless we try, will we?" And try they did. *With nothing to go by except that first SCI story, the Thomases built and operated the first Wankel engine to be run publicly in the United States!*

INVETERATE COMPETITORS

They were especially well-qualified to take on such a task. The elder Thomas was building full-sized planes before World War I and kept at it until the Thirties. The Thomas-Morse scout of WWI, it seems appropriate to recall, was powered by a rotary LeRhone engine – that is, a radial engine in which the crankshaft was bolted to the airframe and the complete crankcase, cylinders and all, was bolted to the propellor and rotated with it. The torque reaction on opening the throttle was interesting, to say the least.

Since his retirement, Mr. Thomas and his son, William T., Jr., have been super-active in building model airplanes and tethered model racing cars. A mere hundred or so of their trophies are allowed downstairs in the living room, several times as many being banished upstairs by Mrs. Thomas. To this experience in dealing with temperamental midget engines should be added a long history of building their own telescopes (astronomical, not bird-watching). Upstairs over their garage is a veritable machine shop whose walls are decorated with photos of World War I Thomas-Morse airplanes and a dismaying collection of broken model airplane propellers. ("We soon gave up saving them.")



GETTING THE GEARS

The first step toward construction was a thorough search of Boston Gear Works' (Quincy 71, Mass.) extensive catalog to see if appropriate gears were obtainable. They were. The hard-to-find internally-toothed gear is listed as G632 and costs $4.70. This 48-tooth, 14½°-pressure-angle gear has a one-inch pitch diameter, is 1/8-inch thick and has a 1½-inch overall diameter. Since the gear train must carry part of the output torque reaction, the power of this miniature Wankel is somewhat limited as this gear is obtainable only in brass. It is also very thin and has little width available for riveting it to the rotor. The externally-toothed gear is no problem. The matching one for our purposes is G138 ($1.20) which has a 2/3-inch pitch diameter and 32 teeth. Three 9/16-inch-thick brass plates were purchased at a marine hardware store in Daytona. After turning on a lathe, they were hand-lapped on fine carborundum paper to extreme smoothness on the near-optical-flat they use in making telescope lenses. The two which were to become end plates were given the high-luster finish on one side only, but the third, center layer was so treated on both sides, which were made parallel within one ten-thousandth of an inch (.0001). Overall diameter is 4½ inches.

When the gears arrived, the small one was staked temporarily to the center brass plate while the other was attached to a bar carrying a scribe to represent an apex of the triangular rotor. When the two gears were meshed and rotated hula-hoop fashion, the scribe engraved the wasp-waisted combustion chamber's outline on the surface of the brass plate.

MATCHING THE HOUSING

The next step illustrates the Thomases' cleverness. They had no cam grinding equipment and even though Daytona Beach is a hot-bed of automotive activity (full scale), they didn't want to farm out part of the job. They looked at the resultant epitrochoidal pattern carefully, and eventually concluded that for fabrication purposes it was close enough to being two circles with a faired-in, slightly curved waist. (The distance between centers of these two holes is equal to the difference in pitch diameters of the two gears or to twice what Dr. Wankel calls the eccentricity. In this case, the eccentricity is one-third of an inch. The ratio between rotor radius and eccentricity sets the fundamental proportions of the Wankel

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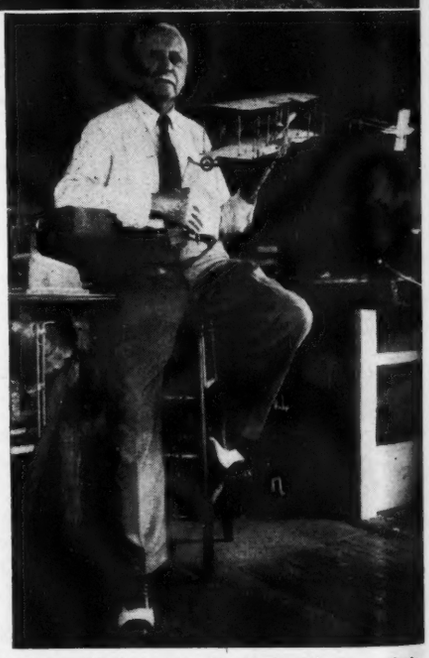
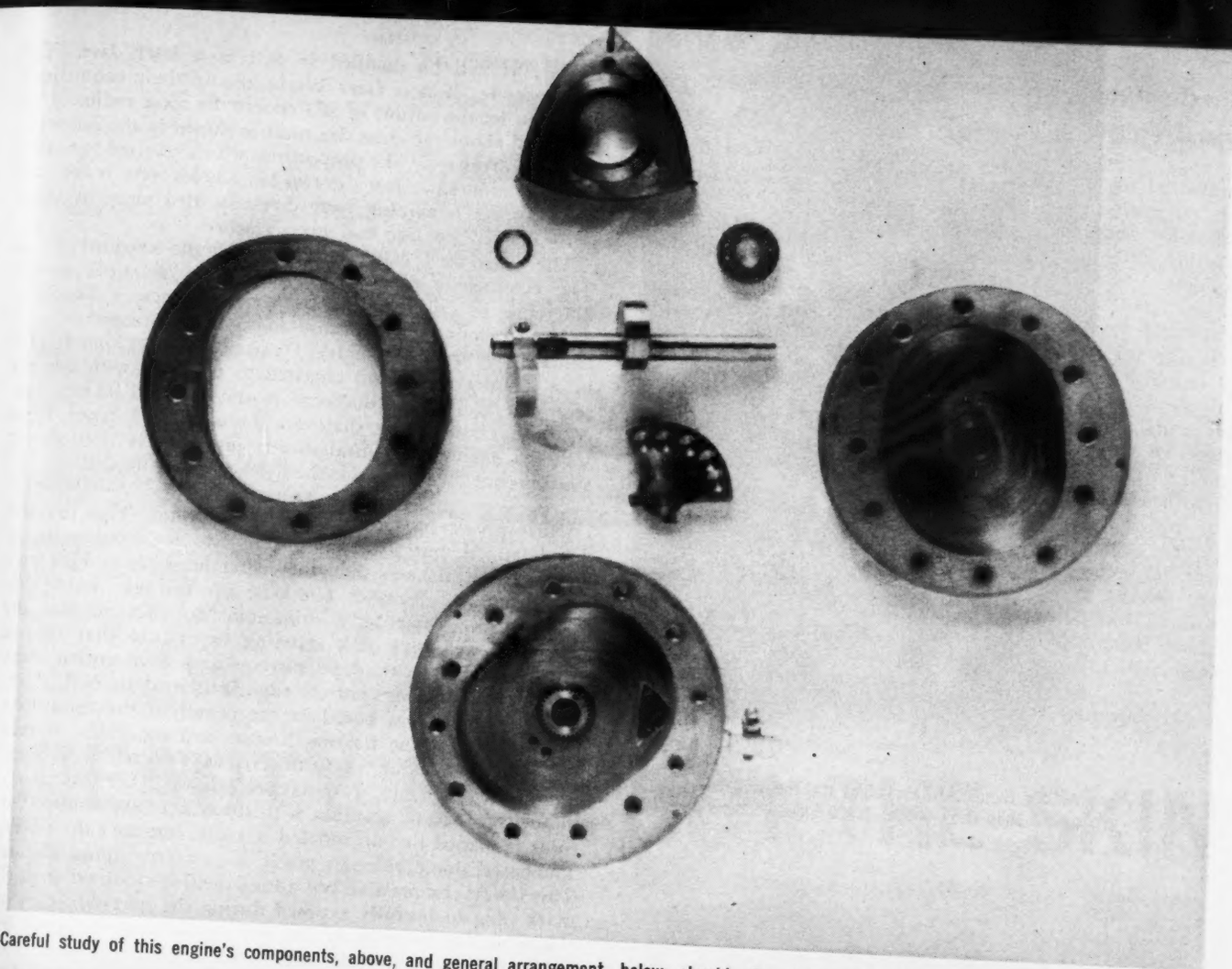
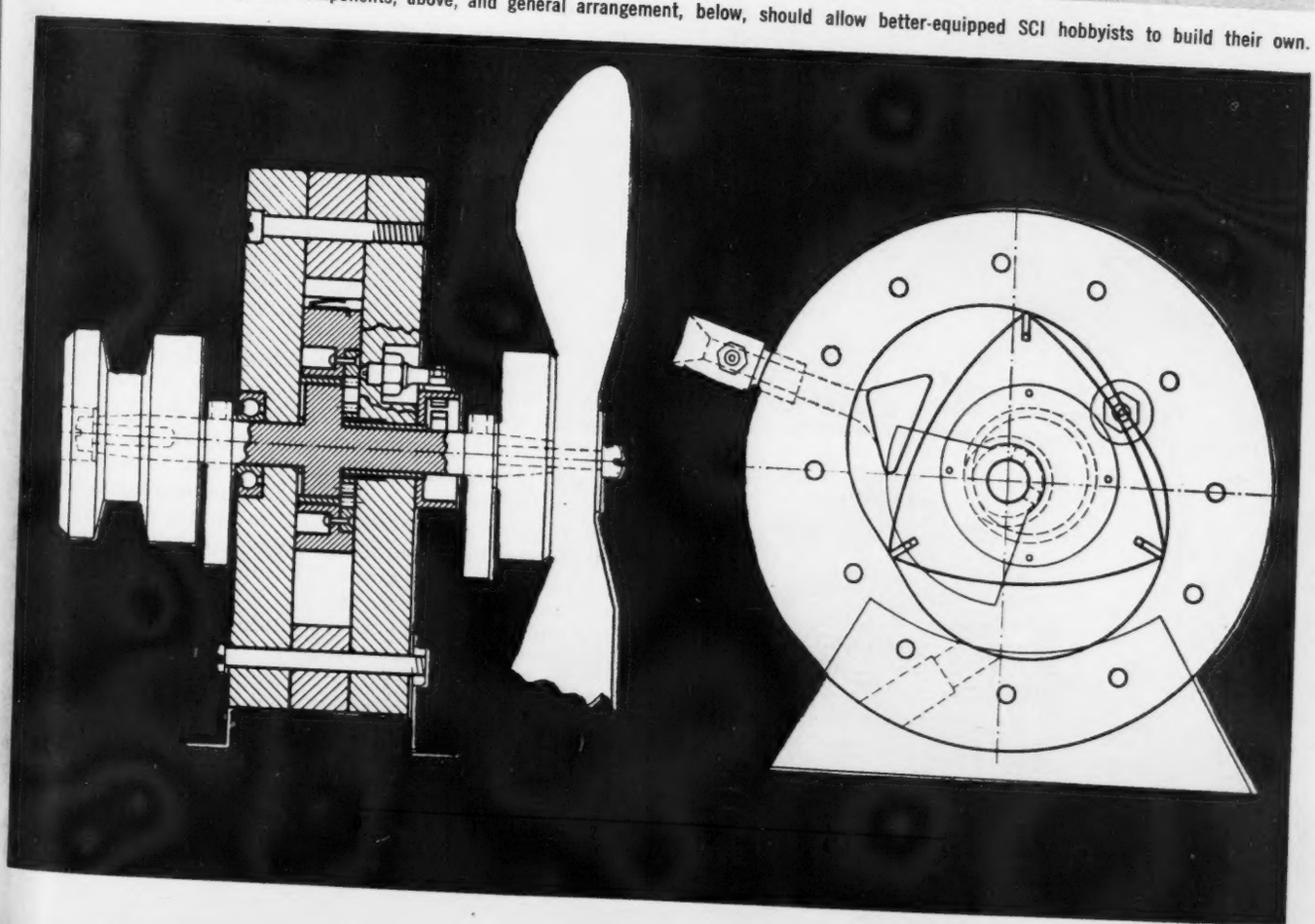


Thomas-Wankel gets finely tuned, top photo. Below, the elder Thomas shows model of his first plane, built from the original plans.

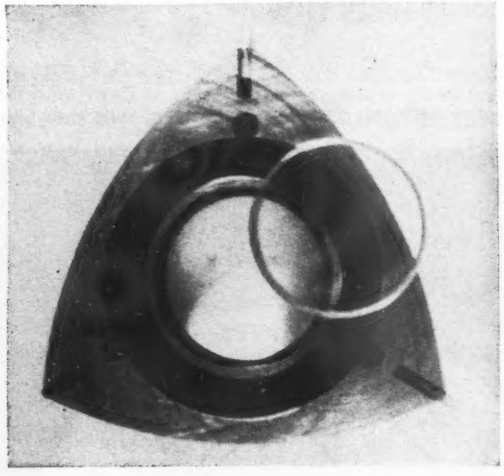


Careful study of this engine's components, above, and general arrangement, below, should allow better-equipped SCI hobbyists to build their own.

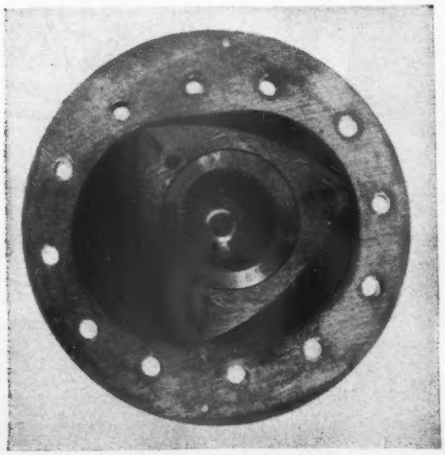


PHOTOGRAPHY: BURNSIDE

William Thomas, Jr. assembles the Thomas-Wankel engine on the shop floor, above. It's a speedy, simple operation.



Both sides of the rotor are shown. Above is its "back", with the bronze bushing, and below it's placed in the housing, seen from the geared side.



engine, as will be detailed in SCI at a later date. The Thomases let Boston Gear Works choose their eccentricity and then let the editors of SCI choose the rotor radius, since they used about the same size rotor as shown in the February article. Fortunately, the proportions which resulted are quite reasonable ones.) After the two large holes were bored, the sharp apexes remaining were carefully filed away by hand until the scribed line had been reached.

The alloy steel crankshaft was a simple machining job. The eccentricity of its single offset lobe is equal to the difference in radius of the two gears. A mere 1/6-inch, it looks like more only because the journal's diameter is so much larger than the shaft's. Quarter-inch-thick, pie-shaped, brass counterweights are attached to the shaft with two set screws each. They lie outboard of the case and its bearings. At both ends of the shaft are brass pulleys taken from tethered racing car installations; just one is needed for starting, but the other adds the flywheel effect needed.

ROTOR AND SEALS

Next project was to make the steel rotor. This too was hand lapped, but to about one or two ten-thousandths of an inch less thickness than the center brass plate. This gave some running clearance but kept gas leakage around the sides of the rotor to a minimum. So effective was the Thomases' telescope lens grinding experience that they've had no trouble with these surfaces and have gotten away without the six long, narrow edge seals used by NSU.

A large hole was bored in the center of the rotor to a .001-inch fit on the floating bronze bushing which in turn had the same clearance on the crankshaft's eccentric journal. A 1½-inch-diameter counterbore allowed the internally-toothed gear to be set flush with the side of the rotor. The rotor is shaped like an inflated triangle, but the sides on the Thomases' don't bulge as much as geometry would dictate. This lowers compression but allows the side-mounted, masked spark plug to be fully exposed during the necessary part of the cycle.The grooves in the rotor's faces, as designed by NSU and C-W, have the same effect on compression ratio and also produce a much more efficient combustion chamber shape, but the Thomases were interested in simplicity, not efficiency.

Now they reached the nub of the rotor engine's problem: sealing the tips of the rotor against the curved wall of the chamber. SCI's drawing showed narrow slots at each apex, so these were carefully cut into the rotor, 5/16-inch deep and 1/16 wide. Tiny plates of hard steel were decided on as the sealing medium, despite complete secrecy on this point by the two manufacturers at that time. (NSU uses high-tensile cast iron). To get a ½-inch radius on the working edges of the seals, the latter are cut longitudinally from one-inch-diameter drill rod. These seals have a side clearance of about .001 inch and are pushed outward against the chamber wall by tiny piano wire springs. A small hole is drilled at the foot of each slot to locate the springs.

NEAT INTAKE AND EXHAUST

Intake and exhaust were handled with exemplary simplicity. The carburetor is just an aluminum rod with a doubly-tapered hole bored into it to form a venturi, plus a conventional model airplane engine needle valve and fuel feed installed at the throat. The intake port is located in the "front" side plate. A hole was bored in the plane of the plate and then turned 90° by cutting in from the inboard surface. Since no effort was made to achieve high outputs, this corner is turned rather clumsily. The Thomases' goal was only to see if they could make their engine run at all, so they weren't concerned about such subtleties.

The exhaust port is also a radial hole, bored this time in the center brass plate.

Simple coil-and-condenser model airplane parts easily take care of ignition. The Thomases veered away from SCI's

(Continued on page 89)

Far fiercer than the first Old Yaller, yet friendly enough to fetch the family bacon, Max Balchowsky's latest road-racer puts function before finery.

► When one of the world's top-ranked Grand Prix racing drivers climbs behind the wheel of a virtually unproven homebuilt special, turns record times on the difficult Riverside Raceway after only a few laps in the machine, then voices his opinion about the car, it makes sense to hear him out. The driver, Dan Gurney, stepped out of Max Balchowsky's new Old Yaller (designation Mark II) bubbling over with praise. "This is as good as the finest car I've driven," said Dan, "and as comfortable as a baby buggy." Dan's only qualification was, in effect, complimentary. He said that he felt he could lap Riverside in two minutes flat if the car only had spot brakes. (Two minutes is the magic lap time sought by all, so far achieved by none during official practice.) Dan's best lap in Yaller was 2:07.8.

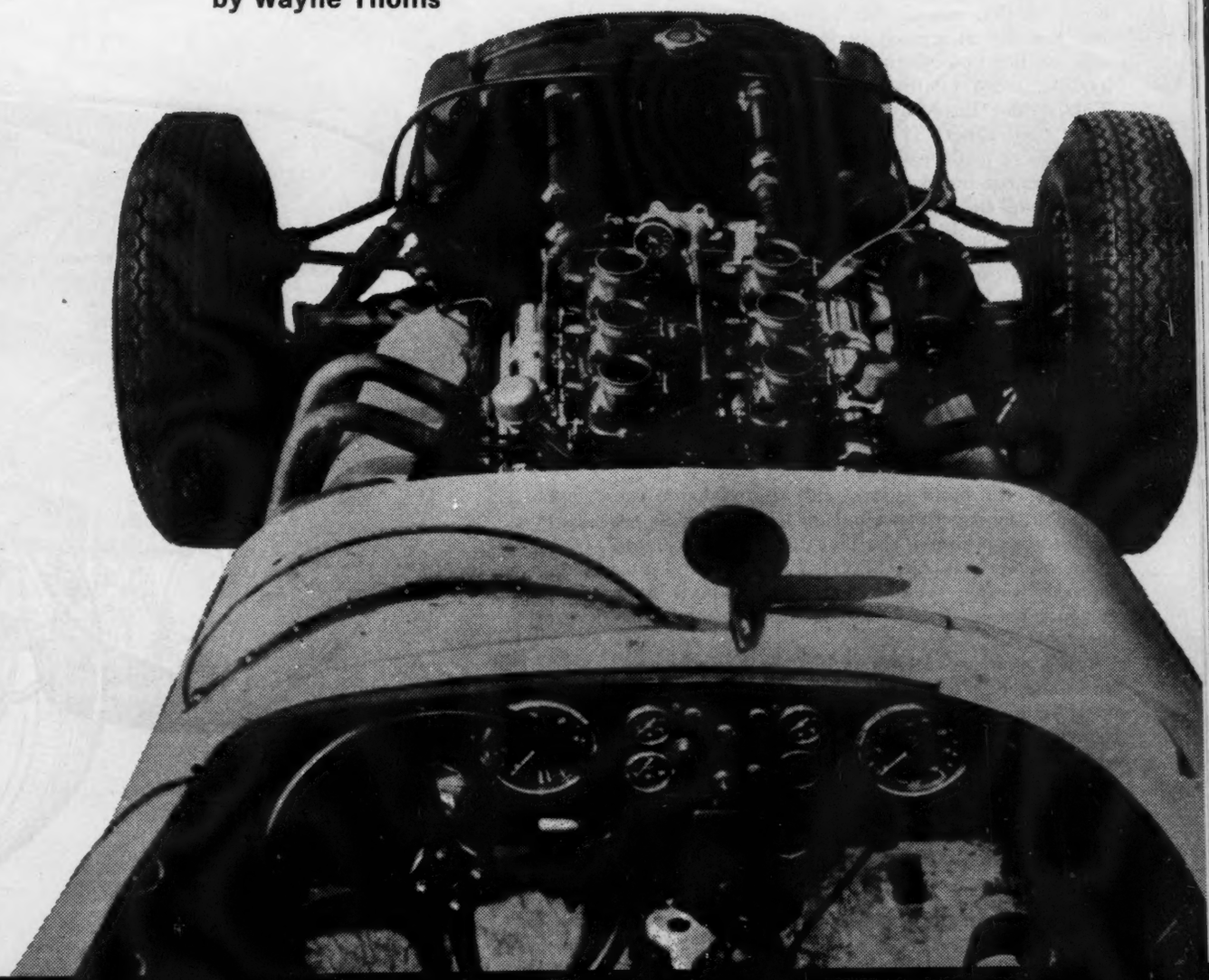
Quite frankly, we couldn't find anything wrong with the brakes, but then our skill behind the wheel precluded giving Old Yaller the sort of ride around Riverside that Dan did. There just wasn't any fade coming off the back straight, braking down from an honest 150 mph (not tops, but our limit of bravery). And Max has never had any brake problems either. The '58 Buick bimetallic drums and linings currently on the car are far from new. Linings have been on for 25 months, dating back to the original Old Yaller. Many races and several thousand street miles failed to diminish their effectiveness until Gurney got in the car. His foot is heavier than Max's and about midway through the recent Riverside G.P. for sports cars the front brakes began to chatter. Later it was discovered that heat hadn't dissipated quickly enough, the natural result being a parting of company between the dissimilar metals in the front drums. Bad as it was, Dan's times slowed only slightly.

The fact that Old Yaller failed Dan while he was leading the event with victory

(Continued on next page)

BEAUTY BENEATH THE SKIN

by Wayne Thoms



in sight was disappointing but didn't lessen his enthusiasm for the car. Why it failed, incidentally, is part of this story. As are the steps that have been taken to prevent the same failure in the future.

WHO MAKES IT GO?

What makes Old Yaller so great? Very simply, the know-how, work and faith of one of the most unusual teams in racing — Max and his petite brunette wife, Ina. This is one wife who goes far beyond the usual mere tolerance of hubby's building and racing a sports car; she not only helped design and build this car but she does most of the maintenance, acts as chief mechanic at the races and doubles as "hostess" at Max's Hollywood Motors repair shop during the week. And it's no gag. She really knows what makes the wheels go 'round. During chassis building, for example, she chalked off the frame shape on the floor and bent the tubes to match.

But the real impetus behind the car is Max — a non-conformist in an age of conformity. He is the refreshing sort of individualist who believes in his ideas and sees them through, even when others equally experienced assure him the ideas won't work. And in this case there were many dissuaders including the engineer associated with a fantastically successful and expensive racing special who assured Max that his frame tubes weren't strong enough — would never stand the load. Max proved him wrong by the simple expedient of crashing a guard rail at high speed (not deliberately) with no measurable frame damage.

No newcomer to the sport, Max's varied racing career began back in 1951 when Phil Hill and Ken Miles were also learning their ways around the first West Coast road racing circuits. In those days it was a Jaguar XK120 for Max (he still holds with Jag gearboxes for his specials). Then came a pure hot rod — a '32 Ford roadster with a Buick V8 that was capable of running with the big Allards and Ferraris. It seemed perfectly natural to stuff a Buick into his handsome Triumph-powered Doretti and this car, too, became a familiar sight on California starting grids. Finally came the Morgensen Special (SCI, May '57) christened "Old Yaller." It wasn't invincible but it was invariably the popular favorite — a homely local answer to Italy's sleek artistry in coachwork. Max furnished the engine, Eric Hauser the car, and they split driving chores with near-equal success.

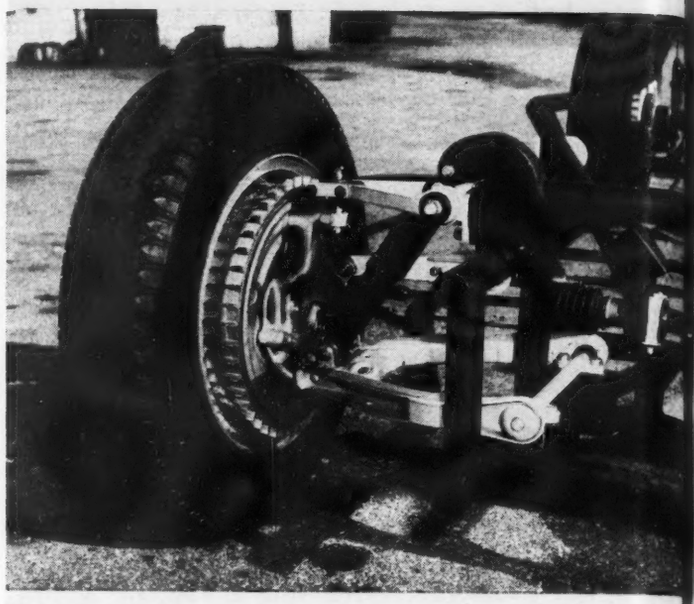
HOW AND WHY OF MARK II

After a friendly dissolution of the Balchowsky-Hauser arrangement last year in which Eric took the engineless chassis, Max determined to build a new car, something that would be his own creation. His aims were not revolutionary. He wanted a machine that would be easy to work on and this meant accessibility of all component parts; it must be capable of being driven by anyone anywhere, a true dual-purpose machine; parts must be readily-available stock items and must be generally inexpensive, and it should win a main event now and then.

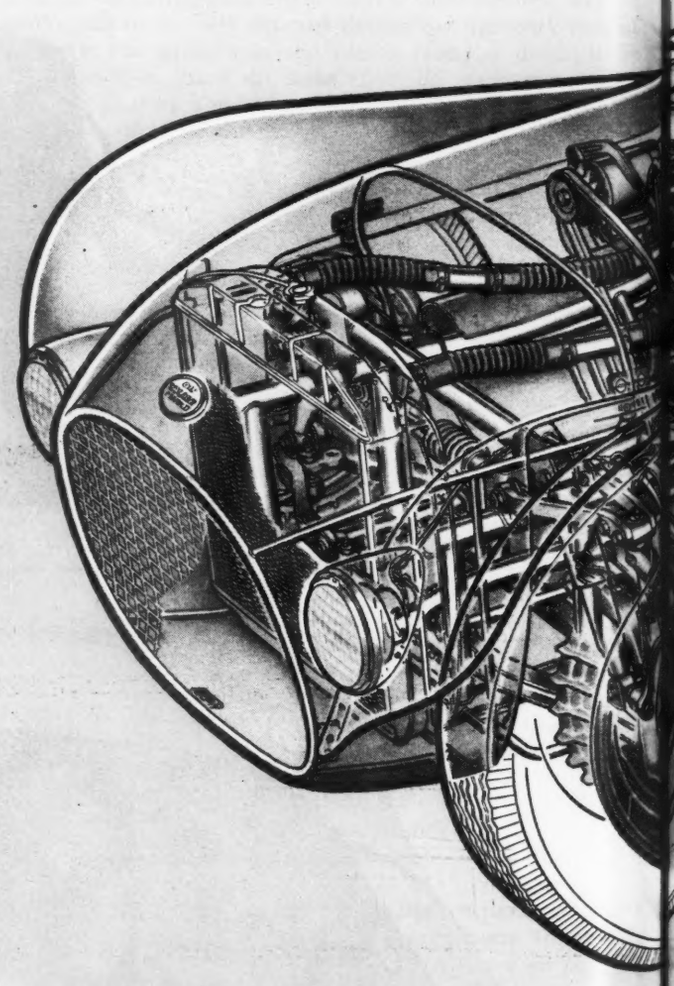
Most special builders start with approximately those goals. Somehow, most get so wound up in the growing complexity of building an automobile that they rarely accomplish everything in one package. Max has done it and in such deceptively simple fashion that many experts look at the evidence before their eyes without really believing that he *has* done it.

Just a year ago Max and Ina began construction. Seven weeks later they had a new car without body. Then followed the forming of the aluminum skin and fitting it over a framework of slender chrome-moly-tube body formers. Max admits to very little skill in the coachwork field. The existing body is the result. Ugly? Crude? Examine it closely. It's admittedly not a work of art, but it's anything but crude. Nose, hood, fenders and rear deck come off as units held by Dzus fasteners. The entire body can be stripped in

(*Continued overleaf*)

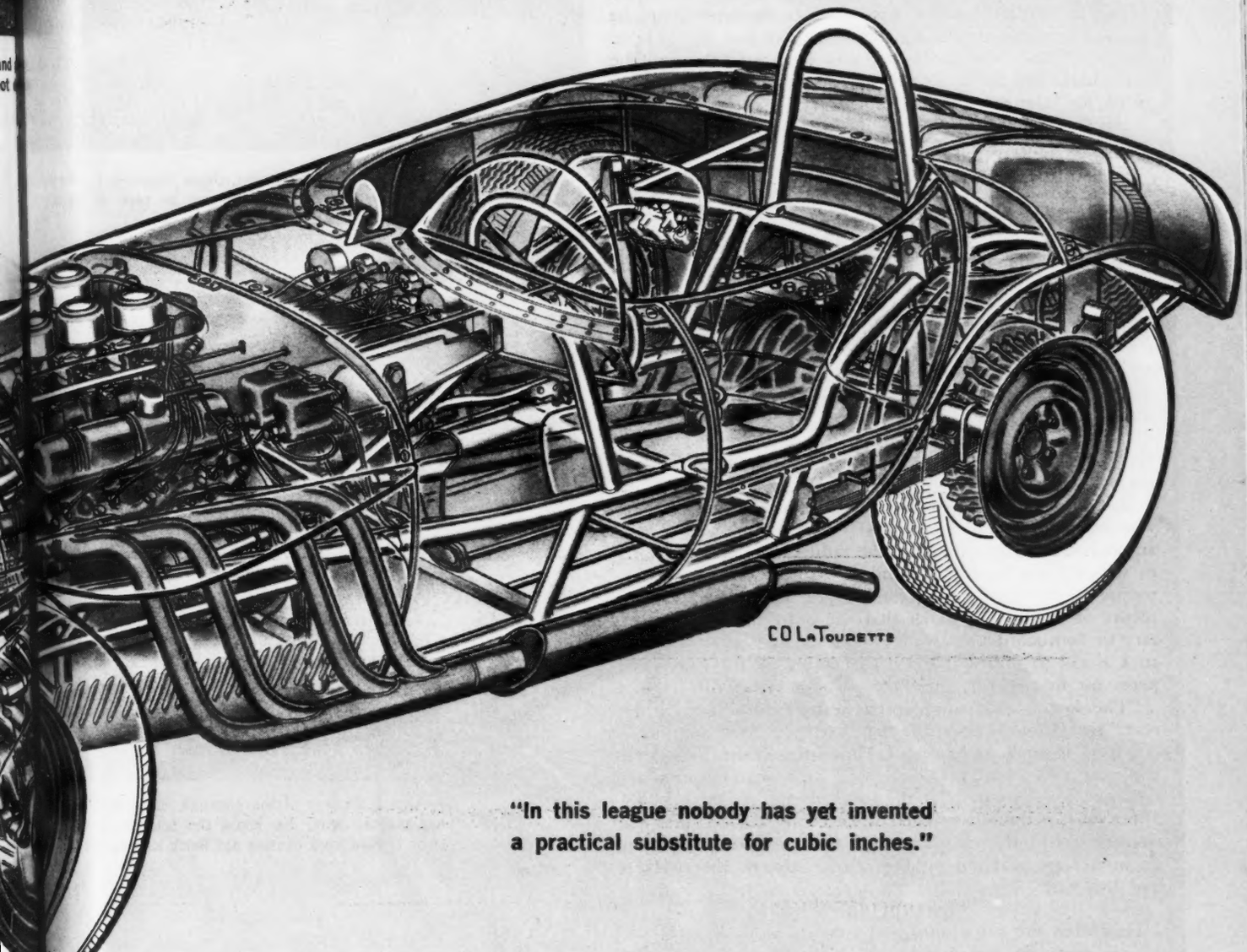


I.f.s. on customer's replica chassis has heavily-finned brake drums and rack and steering, but unlike Mk. II prototype, A-arms are solid — as in cutaway — not



OLD YALLER MK. II

Manufacturer:	Hollywood Motors 4905 Hollywood Blvd. Hollywood 27, California
Displacement	401 cu in, 6571 cc
Dimensions	Eight cyl. 4.1875 x 3.640
Compression Ratio	9.5 to one
Power	305 bhp @ 5400 rpm (dyno)
Valve Gear	OHV, pushrods, solid tappets
Valve Timing	Intake opens 40° BTDC, closes 83° ABDC; Exhaust opens 83° BBDC, closses 40° ATDC. 303° overlap. 500 rpm idle
Fuel Capacity	30 gallons, super premium, 7.2 mpg with carbs; 6.2 with fuel injection
Carburetion	6 Stromberg 97's on Edelbrock log-type manifold or Hilborn fuel injection
Transmission	Jaguar 4-speed and reverse
Wheelbase	93.75 in
Tread, F, R	56, 55 in
Frame	Chrome moly 1¾ x .058 in tubing, upper and lower tubes with crossmembers
Suspension	F, independent, '58 Pontiac A-arms, Morris Minor torsion bars; R, rigid axle, 2 semi-elliptic leaf springs
Shock Absorbers	Monroe or Gabriel tubular
Turns to Full Lock	1⅜
Tire Size	F, 7.10 x 15; R, 7.10 or 7.60 x 15
Brakes	Drum, stock '57 Buick
Weight	1940 pounds with 10 gallons of fuel; 52 percent on driving wheels



"In this league nobody has yet invented a practical substitute for cubic inches."

about 10 minutes. And everything is accessible. Max says, "People used to laugh – and then they watched us work. Just pull off a panel and dig in. It may not look perfect but it's functional."

CHASSIS AND SUSPENSION

As the body appears rudimentary, so does the frame appear basic. Just one step beyond a simple ladder type, Max terms it his "distributed load frame." Main upper and lower tubes are formed from 1 ¾ by .058-inch chrome-moly, as are cross-members and the two roll bars at cowl and head heights. "My idea is a distributed load," says Max. "There is no maximum concentrated loading at any point. That's why it can be so light – about 110 pounds. If there's no concentrated load there are no failures. We figure that it will take a 110-ton impact without damage. Not that I want to be in it when that happens, but it's nice to know that it won't collapse around you."

Front suspension and steering are relatively conventional. Independent A-arms and stabilizer bar are from a '58 Pontiac, torsion bars and rack-and-pinion steering from a Morris Minor, and tube shocks – either Monroe or Gabriel will do. Both may be used as long as they're not the most expensive racing models, which are too stiff. Strangely enough, Max installed the "good" shocks initially and spun on a long banked turn at Riverside. As an experiment, he disconnected the shocks and stabilizer bar and was able to go faster. The front shocks are now from a Willys and the rate checks out at 55/45 when new. Rear shocks are 60/40 or 65/35. "Get them too soft and you bottom on every little bump," explains Max. "And a heavy shock keeps the wheels off the ground. It handles horribly with heavy shocks."

Incidentally, people who believe the myth that Old Yaller's parts come from wrecking yards may be interested to learn about the steering arms. New, they were cut down, welded and X-rayed. Those X-ray negatives testify to Max's thoroughness.

ORIGINAL APPROACHES

The upper A-arms have been well drilled, but not for lightness. The Balchowskys want something to bend in case of collision. When Max hit the crash rail in practice, all that went was the left suspension. He believes that had the arms had their original strength the top front of the frame would have been demolished. "If you make everything too rigid or too strong, you just crack or tear things. Have one part that will bend," he says. "It doesn't take as long to fix that way."

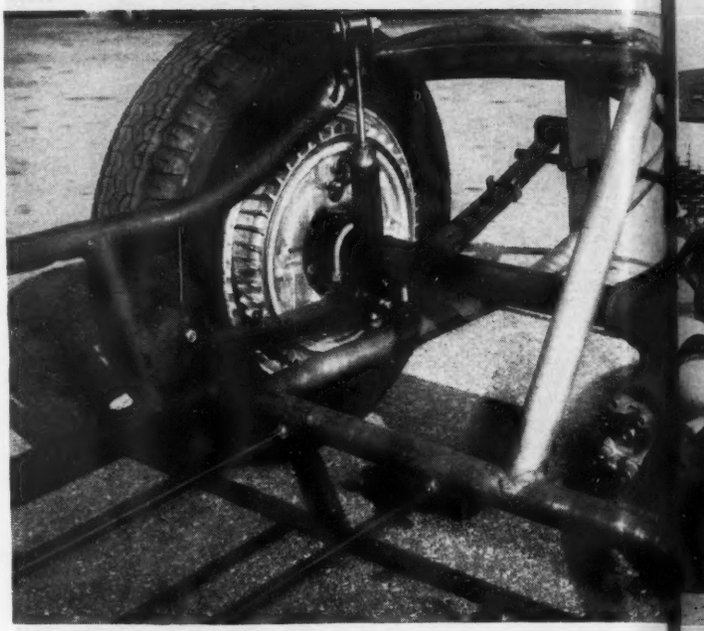
Max has some thoughts on rear suspension that bear investigation. With an engine that delivers brute torque and an open driveshaft, where are the radius rods? Or something to soak up the rear axle windup? "I just tell people 'no torque' when that question comes up," laughs Max. There's plenty of torque – so much that the only place it is necessary to floorboard the accelerator is on long straights. The trick is not to punch it too hard coming off the line – and *never* use first gear!

"The fact is that this car has a trick stabilizer on the rear," says Max. "The whole rear assembly is self-aligning – it'll float as much as ¼ inch." The system is similar to that used on the original Old Yaller. Rear semi-elliptics are mounted conventionally at the forward end. At the rear the lower shackle bolts have been replaced by a solid steel bar running across the chassis. Action on one spring produces an immediate reaction on the other, through the shackles and this bar.

HANDLING

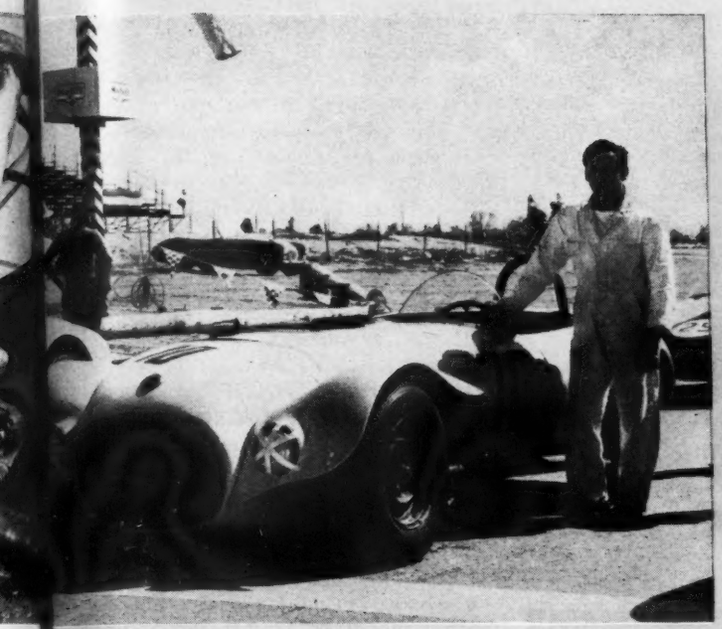
How does the suspension and steering work in practice? Nearly everyone complains that the steering is too light. Just before Gurney took over, Max put a little more tension on the steering rack and it seemed to help. But the front end is really good. After trying to avoid a front anti-roll

(Continued on page 86)

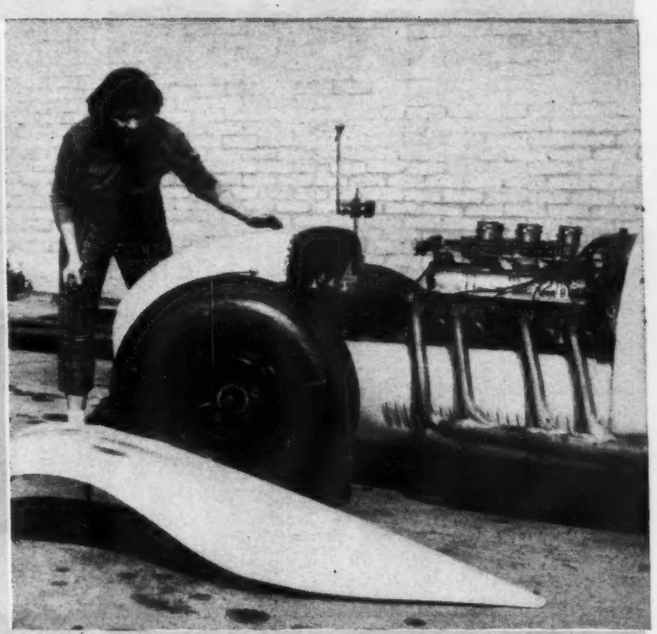


Rear end of new chassis, under construction, shows simple leaf spring axle location. Bar connecting shackle pivots can be seen at right.

Persistent slippage of the harmonic crank balancer has plagued Max. He hopes the solution is this union of Ford truck housing and Buick balance plate.



Max himself drove Old Yaller Mark II in the Saturday amateur races at Riverside (SCI, July, 1960). Styling is strictly for go, not for show.



As author Thoms points out, petite Ina Balchowsky had a lot to do with the new machine. Here she quickly bares the big six-carb Buick.

Longer wheelbase of new frame under construction at Balchowsky's Hollywood Motors shows up in comparison with Old Yaller II. Roomy, stiff frame is excellent job of practical engineering, easily handles the genuine 305 bhp from Max's modified Buick V8. Frame buyer specified Borrani wire wheels.

SCI'S COLISEUM CONCOURS

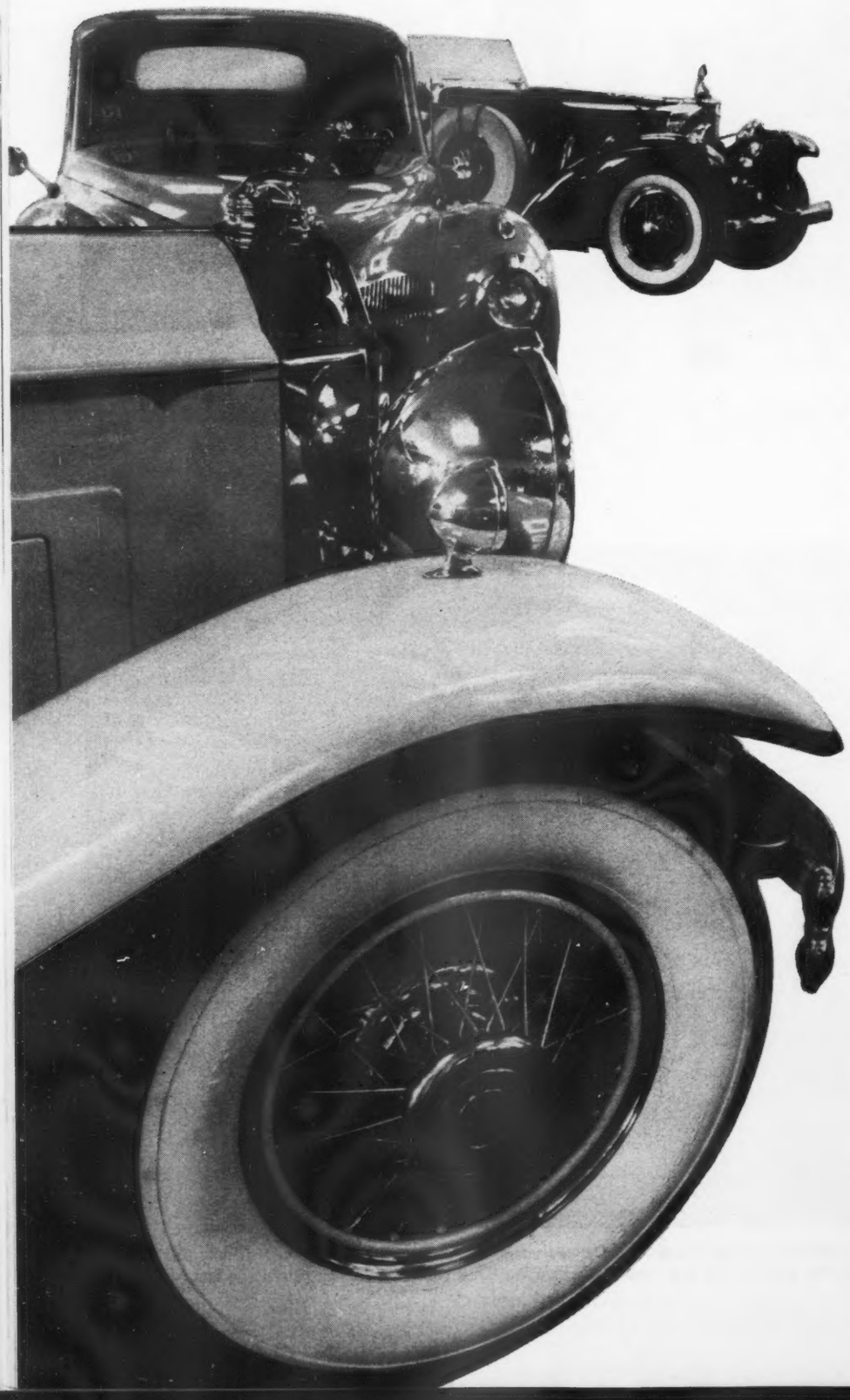
► In April, the place to be is New York if you're interested in cars. This year's Fourth International Automobile Show, held in the multi-leveled Coliseum, was a fantastic kaleidoscope of all the wild and wonderful machinery that's built under the name of "automobile" — plus more than a few scooters and motorcycles to fill in the occasional open areas.

SCI was proud to be able to give the Show an assist by organizing the 1960 Concours D'Elegance, in which outstanding cars competed for trophies in five classes: Antique, Classic, Competition, Sports and Modified American. Many of these delectable cars are shown on these two pages; we would have liked to have shown them all. Among those not here are G. B. Calkins's 1934 Lagonda, and the 1906 Winton and 1910 Speedwell of William Pollock and Stanley Tarnopol, respectively. Two classics not shown are Bob Pease's 1931 Cadillac V12, and the 1937 Packard of Henry Etlinger.

In the Sports class, Avon and Roma Wilcke brought their immaculate Healey Sprite all the way from Roswell, New Mexico to take the Best-in-Class trophy, competing against the Squire, Nathan Thaler's 1959 Ferrari and Peter Borre's Triumph Italia. Modified American cars also included Velio Talamelli's Pontiac, John Donoghue's Chevrolet, Samuel Fader's Lincoln V12 and Leonard Wehrle's Packard Darrin.

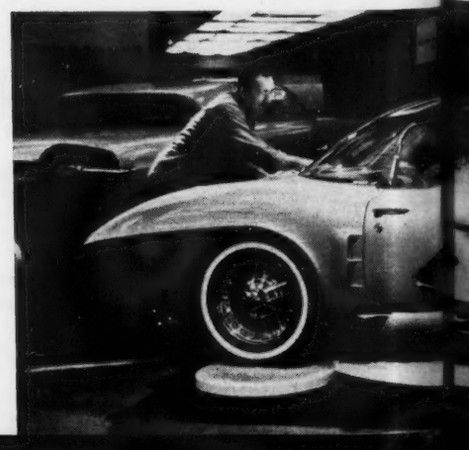
The difficult decisions were reached by an outstanding judging panel: Ken Purdy, James La Marre, Walter Cronkite, Wolfgang Robinow, David Ash, William Conrad, and James Melton.

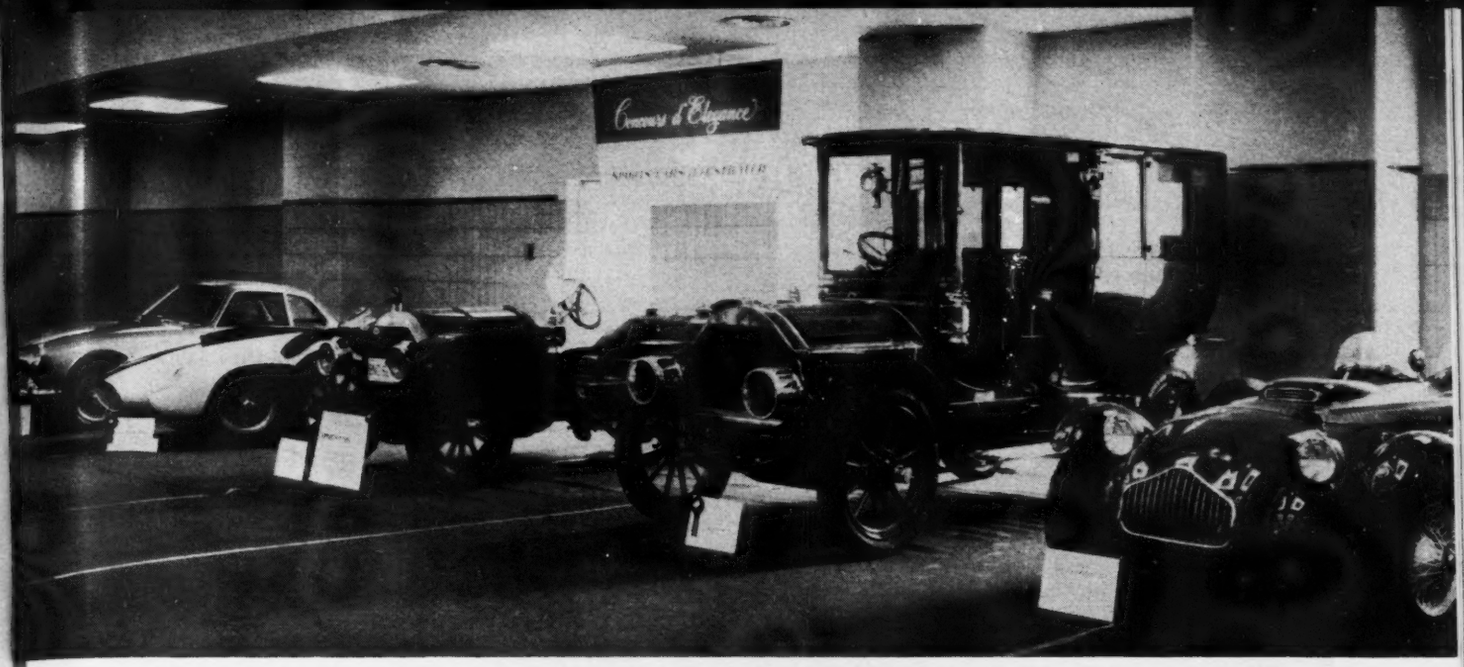
—SCI



The 1928 Mercedes-Benz touring car owned by Stephen Pitcairn and the 1941 Lincoln Continental of Jesse Haines are framed (left) by the Packard Eight owned by Stephen M. Billett. This 30-year-old example of prewar workmanship outpo' 'ed four other classics to win its class.

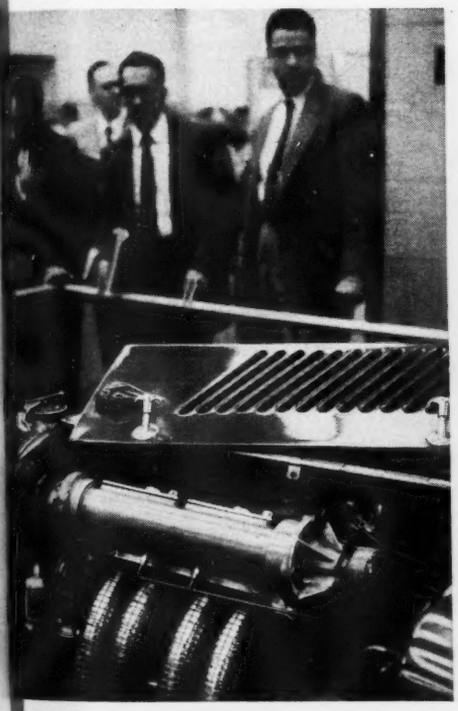
One of the special exhibits was this interesting variation on the Corvette theme by GM. Outside exhausts, bubble canopy, and "hungry-shark" nose drew ohs and ahs from the thousands of people that thronged SCI's Concours display.

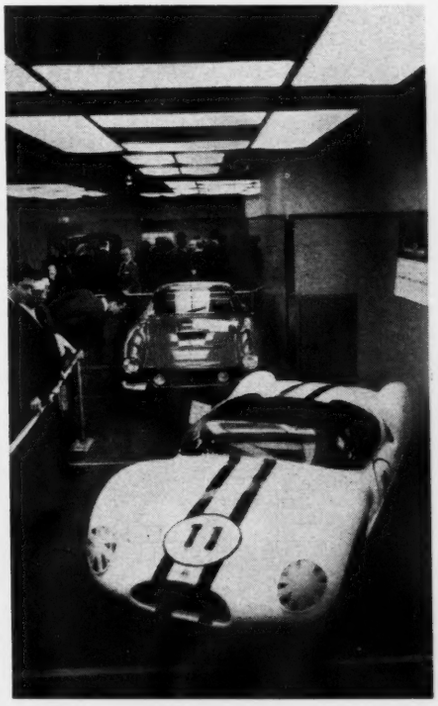




Above from left to right at the Concours are: Ensign Peter Borre's 1960 Triumph Italia, 1959 Ferrari Super Monza owned by Jeff Scott, 1914 Mercer Raceabout owned by Ralph Buckley, 1905 Pierce-Arrow Limousine owned by Dr. Samuel Scher, 1953 J2X Allard owned by C. James Harper, Jr. The Super Monza won in the Competition Class, while the Pierce-Arrow was the best Antique.

PHOTOGRAPHY: DOLIN

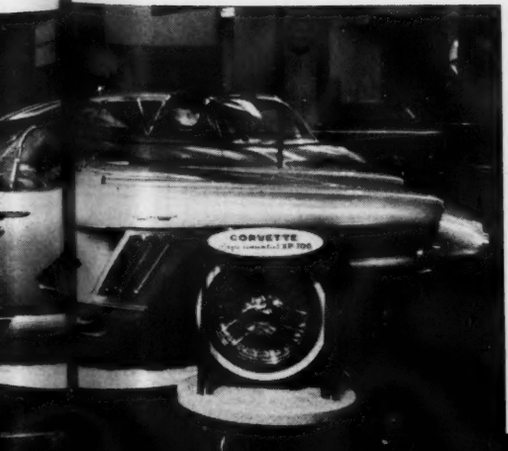




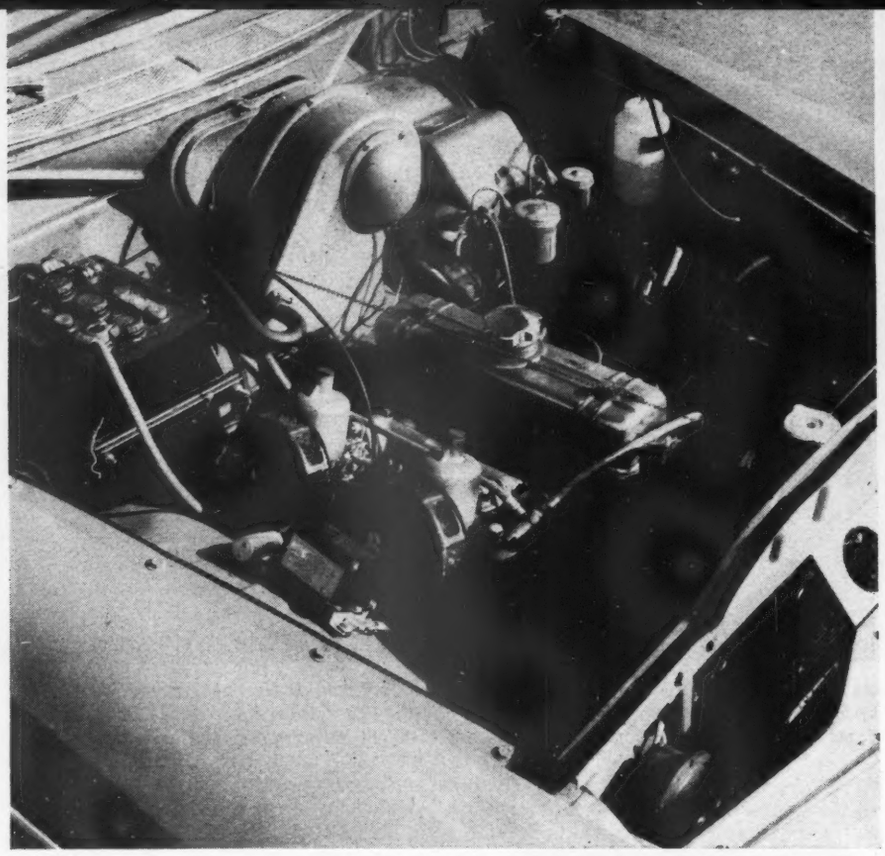
The engine room of Edward W. Sandgren's X-101 Squire was a positive magnet for enthusiasts. Power (far left) for this magnificent car is provided by a supercharged twin-cam four, with the blower mounted ahead of the engine. Those wonderful burnished exhaust pipes are hidden when the hood sides are clipped into place!

New York Rambler dealer Charles Kreisler was responsible for the entry of the white and blue Cooper Monaco in the foreground and the fierce blood-red 3-liter Ferrari coupe in the background. Both cars, naturally, were entered in the Competition Class. The Cooper is usually seen in action with John Fitch at the wheel, while the Ferrari finished fourth overall at Sebring with Ed Hugus and Augie Pabst sharing the driving.

Mills-Duesenberg (below) entered by Dr. William J. Hoffman and W. Hudson Mills had no trouble in running off with top honors in the Modified American Class. It should be noted that the engine fills the space from the rear of the radiator right back to, and almost touching, the cowl!



VOLVO 122S



In this case, good things come in fours, cylinders and doors, wheels and passengers. In both compartments, accessibility is good and the appointments are well-designed.

► The relationship between Sweden's two Volvo sedans, the two-door PV 544 and the four-door 122 S, highlights dramatically the essential differences between American and European practices in car building. In this country, the four-door is a two-door plus two with a 50 to 200-dollar stiffer tab. With Volvo, the extra bite is nearly $500 and the resemblance to the two-door is entirely subcutaneous. For this large price jump, one gets a much fancier, more luxurious car with styling that is conservatively modern in the Daimler Benz school. For reference, our only extensive report on the Volvo 444 was back in September, 1956. Capsule tests on the hotter engine and four-speed gearbox versions appeared in October, 1957 and September, 1958 respectively.

Externally, the four-cylinder overhead-valve engine looks like a twin to the XPEG engine once used in MGs, even to the S.U. carburetors. Inspection reveals it is not (shorter stroke and bigger bore) and the proof is found on the dyno where the Volvo is rated at 85 bhp at 5500 rpm (by SAE standards). When first announced, this figure caused many a self-styled expert to snort in disbelief, but the make's racing history against production two-seaters in America has stilled the most doubtful Thomases. If you love machinery for its own sake, you should get to see the innards of these Swedish engines. It's enough to have made at least one SCI reader install one in an MG!

Despite its lively output, the engine is a quick starter and smooth puller. As a stunt, starting the car in gear with the clutch engaged was not only possible but reasonably smooth. The clutch, incidentally, bites smoothly but not suddenly. Considerably smoother still is the marvelous transmission with synchromesh on all four forward gears. There are too few such gearboxes in production and they are supremely satisfying to use. The Volvo's sturdy shift lever has a pleasant large knob to grasp and moves smoothly and firmly through a very definite pattern. Compact for a floor shift, it's only seven inches from third to fourth. There are no tight spots where the gears seem reluctant to engage, yet no lateral play either. Between the engine's performance and the box's four *usable* speeds, the Volvo is quite a stop-light go-er in either body configuration. First gear can be used to pull stumps, but since it's good up to some 30 mph, it's okay for pulling out ahead of other traffic too. Our only complaint about the ratios shows up in the "step" column in the Drive Train section of the specifications. The 66% step between second and third is almost twice that between third and fourth and actually larger than the 58% between first and second. Ideal ratios for acceleration would have equal steps between all gears but this is always compromised to permit some stump-pulling in first and a bonus in passing ability in top-minus-one. A bright spot on the horizon is the list of ratios for Volvo's new P 1800 sports coupe: 1.00, 1.36, 1.99, and 3.13 (3.25 reverse) giving steps of 36%, 46%, and 58%, as nice as you can ask for. Perhaps they could be used in the sedans as well.

Volvo specifications make prosaic reading indeed, which only shows that it's not *what* you do so much as *how* you do it. The front is conventionally independent with a coil and pair of unequal wishbones at each side connected by a torsion anti-roll bar. A rigid axle at the rear with coil springs is located fore and aft by parallel pairs of trailing radius arms, and laterally by a track (or Panhard) rod running transversely between the frame on the right side and the axle casing on the left. The axle's kept from winding up by the same pairs of radius rods. Large wheel movements are permitted which gives a soft ride and quite a bit of roll, but all those arms keep the wheels from sliding around under the car so the handling is first-class. The axle's weight shows up on rough roads during especially heavy acceleration or braking.

As well as being referred to as "products of superb Swedish engineering", the Volvos are described as "Sports sedans" –

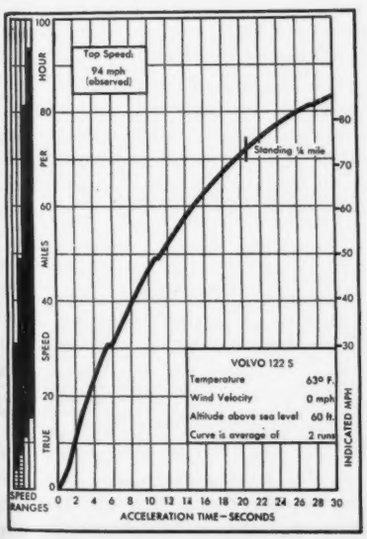
(Continued on page 90)

ROAD TEST

VOLVO 122 S

Price as tested: $2807 East, $2895 West, POE

Importer: Volvo Import, Inc.
452 Hudson Terrace
Englewood Cliffs, New Jersey


Top Speed:
94 mph
(observed)
Standing ¼ mile
VOLVO 122 S
Temperature 63° F.
Wind Velocity 0 mph
Altitude above sea level 60 ft.
Curve is average of 2 runs
TRUE MILES PER HOUR
INDICATED MPH
SPEED RANGES
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
ACCELERATION TIME—SECONDS

ENGINE:

Displacement	96.5 cu in, 1582 cc
Dimensions	Four cyl, 3.125 x 3.15 in
Compression Ratio	8.2 to one
Power (SAE)	85 bhp @ 5500 rpm
Torque	87 lb-ft @ 3500 rpm
Usable rpm Range	800-6400 rpm
Piston Speed ÷ $\sqrt{s/b}$ @ rated power	2875 ft/min
Fuel Recommended	Premium
Mileage	24-28 mpg
Range	285-330 miles

CHASSIS:

Wheelbase	102.4 in
Tread, F,R	51.8 in
Length	175 in
Suspension: F, ind., coil, wishbones, anti-roll bar; R, rigid axle, coils, track and radius rods.	
Turns to Full Lock	1¾
Tire Size	5.90 x 15 (or 165 x 380)
Swept Braking Area—drum F,R	126, 113 sq in
Curb Weight (full tank)	2340 lbs
Percentage on Driving Wheels	47%
Test Weight	2470 lbs

DRIVE TRAIN:

Gear	Synchro?	Ratio	Step	Overall	Mph per 1000 rpm
Rev	No	3.55		16.19	4.7
1st	Yes	3.45	58%	15.72	4.8
2nd	Yes	2.18	66%	9.92	7.7
3rd	Yes	1.31	31%	5.96	12.7
4th	Yes	1.00		4.56	16.7

Final Drive Ratio: 4.56 to one.

TUNER of TWO-STROKES

by O. G. W. Fersen

The DKW two-stroke has only seven moving parts, but A. W. Mantzel knows how to make them move faster than anybody else in European racing.

► The story of A. W. Mantzel, the second "M" in the MBM Formula Junior race car, unfolded in Spring of last year at Pferdsfeld airfield in Germany, when a U.S. Air Force officer drove a borrowed and beat-looking old DKW sedan to the starting line of a race at the Air Force-managed field. No one would have bet on the old tin sled, but when the roar and smoke of the exhausts faded, the Deke was out in front. Some experienced drivers narrowed the gap in the bends, only to fall behind on the straights as the DKW simply ran away from them. The car was in fact a mobile testbed for the work of Albrecht Wolf Mantzel, an independent automotive engineer, who tuned its three-cylinder engine as a kind of hobby with no intention of racing it himself.

A. W. is a restless man, bristling with unorthodox ideas on how cars can be improved. His specialty is the two-stroke engine. Born in Berlin in October, 1914, he graduated from the University of Breslau as a mechanical engineer. At the age of 15, he took up motorbike racing but his interest later shifted to cars. In the 1930s, he had a hand in development of the then-famous URE 250 DKW double-piston racing engine. Once while assembling one of the engines, he accidentally dropped the crankshaft. It wasn't damaged, but unnoticed by A. W. the cams actuating the supercharger piston slipped out of adjustment. On the testbed, this engine developed five horsepower over its former output, winning for Mantzel a reputation of being able to perform mysterious wonders with two-strokes that has lasted to the present day.

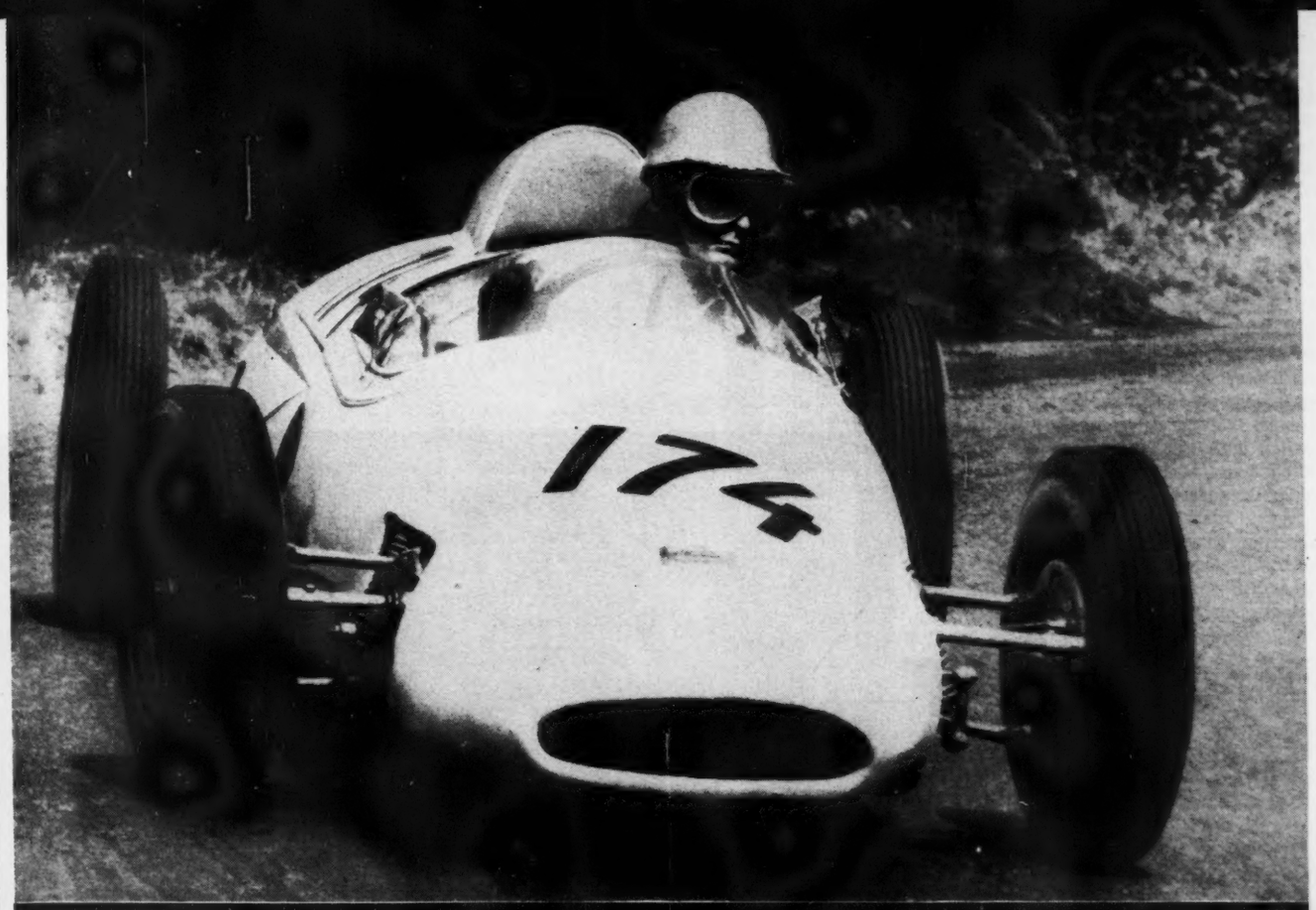
But not all of Mantzel's achievements can be attributed to luck. While at the University, he pestered his professor with drawings of a rotary-piston combustion engine he had evolved, asking if he should seek patents. Brushed off by the teacher, he applied for a patent anyway and was granted German patent number 883905. Today there is much talk of the Curtiss-Wright-NSU-Wankel rotary-piston engine working on similar principles. After World War II, he settled in Stuttgart and busied himself with design and development of a two-stroke diesel. Although it showed promise on the test stand, it never reached production. In the late 1940's, A. W. came up with a flexible road wheel. On this wheel, the rim was fixed to the hub by two rubber discs. While the wheels gave an improved ride, better road adhesion and reduced noise, they never had commercial success because they were too expensive to manufacture. However, there are indications they will reappear in an improved form in the future.

Today A. W. is rated as one of Germany's foremost independent experts on two-stroke engines. Not always concerned with sheer brute power and maximum speed, he developed engines for fuel economy too. While a member of the Muller-Andernach design team, he did extensive work on the Saab 750 cc engine. Mantzel competed in the 1958 Caltex Economy Run in a Saab, the only two-stroke-engined car entered, and finished outright winner with an average fuel consumption of 50 miles per U.S. gallon. During the same year, A. W. decided to start his own business . . . tuning two-stroke engines. With his wife and four children, he settled in Hockenheim, a village near Heidelberg, renowned for its fast racing circuit.

Soon after the Pferdsfeld race, marking Mantzel's entry into serious racing, he built an 1100 cc out-and-out racing engine for an Italian client. Based on the standard DKW unit, it gave 83 bhp at 5250 rpm on the dynamometer. "The power of a two-stroke engine is primarily dependent on its exhaust" is one of A. W.'s working rules. Thus his power-extracting method usually begins at the rear end by improving the exhaust system. The weirdest contraptions have been tried, rejected, tried again and improved until optimum results were obtained. New, stiffer crankshafts were developed and the original cast alloy pistons replaced with forged ones.

During the testing and development program that ultimately led to an 1100 cc engine producing close to 100 bhp, Mantzel met Swiss racing driver Peter Monteverdi, the first "M" in the MBM racer. Monteverdi happened to have a good rear-engined, fiberglass-bodied Junior racing car but lacked a suitable engine. A. W. had the engine but needed a suitable car. Agreement was soon reached and shortly thereafter the first MBM (Monteverdi-Basle-Mantzel) racing car roared along the fast straight at the Hockenheim circuit on her maiden trial.

Another MBM venture is a Kart, while Mantzel has been busying himself with construction of a two-cycle sports car. Still in the talking stage are plans for a flat six that may power a Formula 1 monoposto. For those who are interested, MBM is represented in this country by Dr. Alex Ratelle, in Minneapolis, Minnesota, who has re-named this Junior the "Machan". —*OGWF*



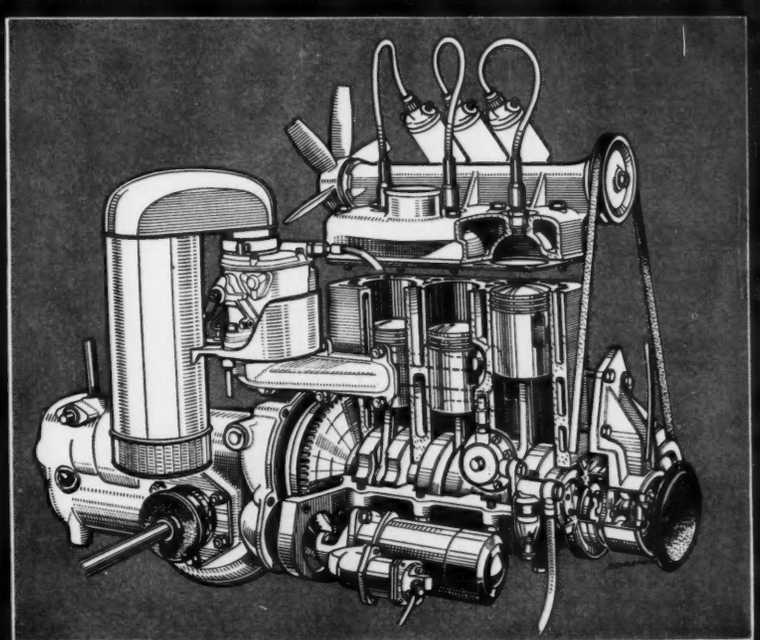
THOSE FABULOUS DKW JUNIORS

► In spite of the fact that Formula Junior got its start in Italy, it has quickly become the most truly international racing Formula now in effect. Not since the AWE sports car, for example, have we had real East German competition like that provided by Siegfried Melkus's Wartburg-based Junior, seen above at the Schauinsland Hillclimb. The sensation of this year's Junior races, in fact, has been the performance of two-stroke-powered cars — mainly DKW-based.

Seen in stock form, at the right, is the sturdy 896 cc version of the DKW unit. With its 980 cc big brother (Auto Union 1000) it's the overwhelming choice of German Junior builders, because it's very sturdy; because they know a lot about how to tune it, and . . . because the factory, in Germany, supplies subtle assistances to selected users of DKW engines.

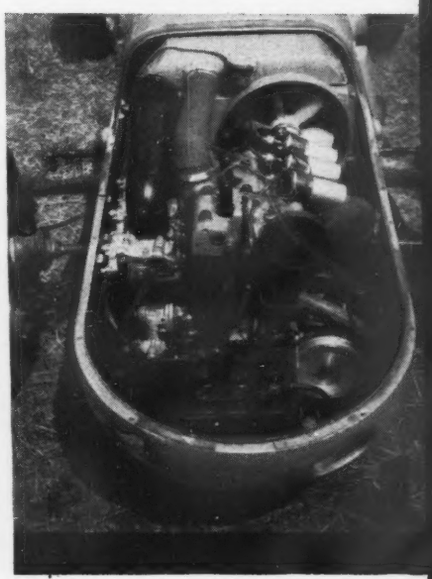
In the past the Achilles heel of tuned "Dekes" has been the crankshaft bearing construction, which has reportedly been remedied by the needle-bearing shafts now being made for the 1000 Sp. engine. The main problem now seems to be proper design and fitting of the pistons — always overworked in a two-stroke — especially for longer-distance events.

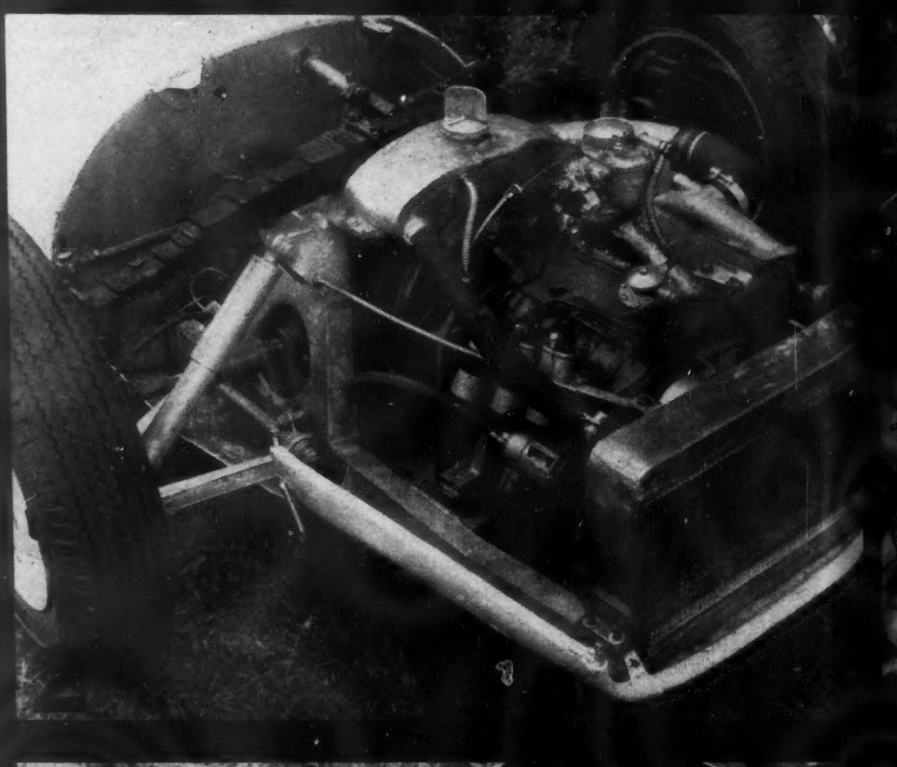
On the next two pages SCI presents a panorama of these remarkable engines that look so mild but go so very well.



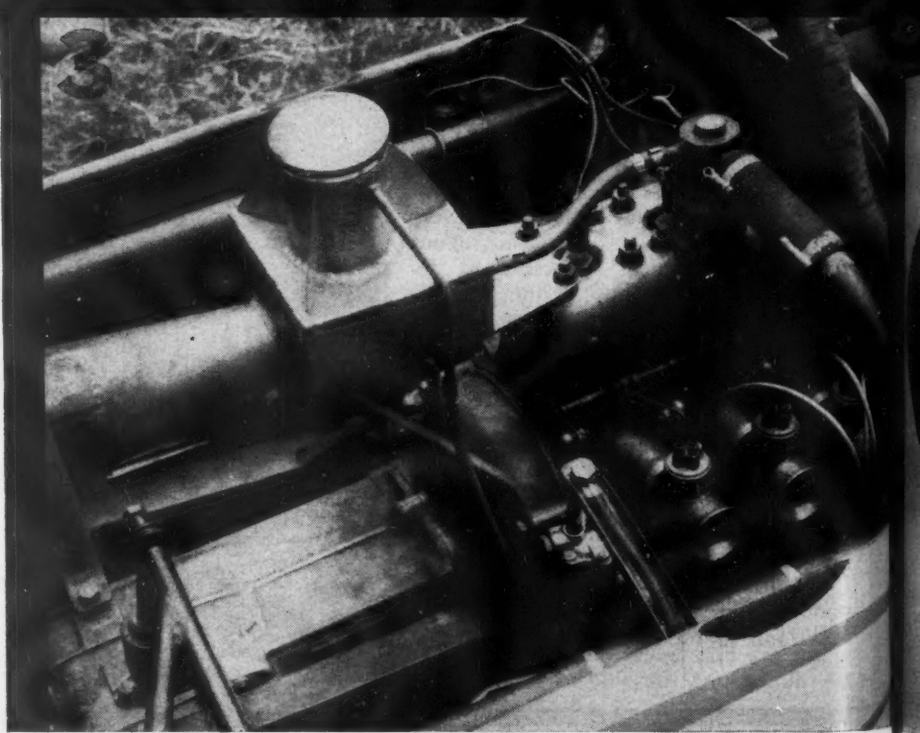
PHOTOGRAPHY: WEITMANN

1. In his early 1959 car, Alfred Hartmann of Berchtesgaden (address: Nonntal 10) used three big Solex carbs, with air filter, on his 980 cc engine. In this trim it developed 80 bhp (DIN) at 6000 rpm, in a car that weighed about 790 pounds. Hartmann retained front-wheel drive (said to be necessary to get aid from Auto Union!) and placed the radiator behind the engine. In his later cars he has gone over to Dell'Orto carbs and relocated the radiator conventionally. A brand-new 1960 Hartmann is now being raced in the East by the distributor, Frank Wagenhofer (Rte. 17, Montgomery, N.Y.).





2. Erich Bode tried an unusual engine position in his Junior, which was among the first to run in Germany. Since the "Deke" has no oil pan, it was easy to slant the block steeply to the left to lower the center of gravity and the frontal cross-section. The rest of the car wasn't so aerodynamic, however, with a very high tail section. A fabricated box-section frame joined the front-mounted engine-drive unit to the simple swing-axle rear suspension. When this shot was taken, Bode's engine still had the stock intake system. A high header tank allows a low placement of the radiator.



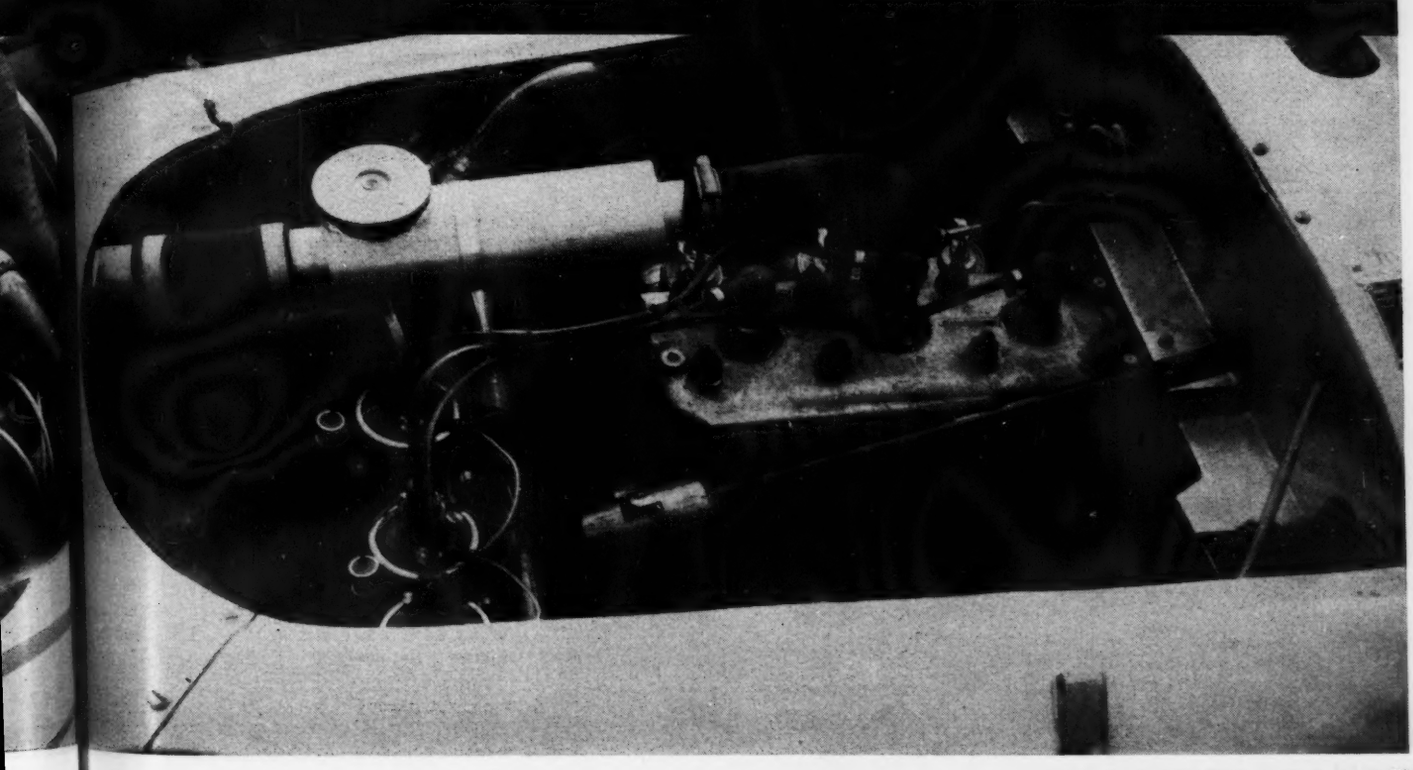
3. Here's the power unit in the rear-engined Junior shown in our lead photo on page 57. Bulky in appearance but perhaps not in actual weight, Siegfried Melkus's cars have neat space frames and coil-spring independent suspension at all four corners. Engine and drive assembly are by Wartburg, the East-German heir to DKW tools and traditions. For this car, Melkus kept the stock 900 cc displacement and bolted on three motorcycle carbs, fed from a single float bowl at the rear. Output is said to be between 70 and 73 bhp; it reaches the rear wheels through a weird dual chain system.

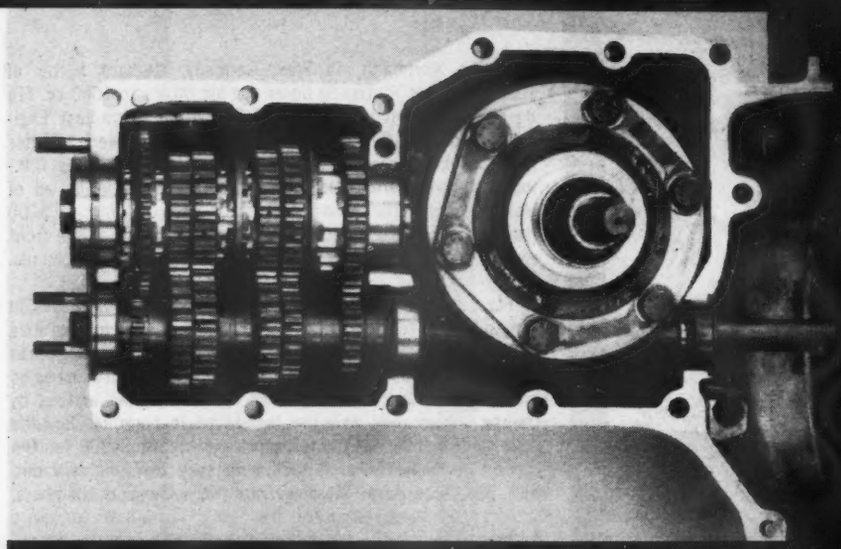
4. Unlike Hartmann, in West Germany, Gerhard Mitter of Leonberg (near Stuttgart) bores out his DKW's to 1080 cc. (To do this job, pistons can be obtained from North-East Engineering Co., P.O. Box 153, Turin, Italy for $24.50 each.) Mitter increases compression ratio to 9.6 to 1 and fits three G.P.-type Dell'Orto carbs, with three separate float bowls, all of which help to produce a "guaranteed" 85 DIN bhp at 6000 rpm. This particular unit is seen mounted ahead of the front wheels of Mitter's 1959 Junior, which weighed 920 pounds.

5. For 1960, Mitter has made an exchange deal with Elva in England. One result has been this new car, which uses Elva light-alloy wheels. This machine has a new chrome-moly tube frame, space-type, that weighs a scant 33 pounds. Suspension is DKW front and back, the solid rear axle being located by trailing radius rods and the transverse leaf spring. Body is fiberglass, and Mitter quotes a price of about $4000 for the car in Germany. Exhaust system is very carefully laid out, with big megaphone blasting into two expansion chambers.

6. The latest Junior to standardize the hardy DKW is the Scorpion, produced by Rytune Engineering in England and sold here by Ray Heppenstall (333 W. Glenside Avenue, Glenside, Pennsylvania). Its 81-horse engine is tuned by Frank Webb, erstwhile HWM team manager, whose "Deke" conversions are soon to displace the Mitter units now used in Elvas, according to Heppenstall. Webb uses three Amal carbs, places the engine in a space frame much like the Elva's, wraps the whole in a fiberglass body. The price, ready to race, is a flat $5000.

FERSEN





► We mentioned in the June SCI that Valerio Colotti was designing a "Deke" powered Junior car. Here it is in the flesh, completed in the double-quick-time taken for granted in Modena.

The whole project is sponsored by Wolfgang von Trips, who has been deeply involved in Formula Junior since it went international. Designed by the good Valerio, this first car has been built by Trips's mechanic, Neri, and bodied by Fantuzzi. The object was to turn out a car that could be built in quantity if the demand was there, but as yet there are no firm plans for production.

It's been named the "TCA," standing for "Trips-Colotti-Automobili."

THE ULTIMATE DKW JUNIOR

PHOTOGRAPHY: WEITMANN

1. Colotti, the gearbox specialist, has laid out five-speed internals to fit in DKW, VW and Fiat transmission cases. This is the VW setup, basically like that in the TCA's DKW-cased box. Later on, the housing from the smaller DKW 750 may be used, also with the five-speed gearing. The TCA's clutch is disengaged hydraulically.

2. Prospective importers for the TCA may be put off by this view of the tiny cellar where the frame was built. Trips and Neri (at right and center) are reviewing the job with the frame's fabricator, who works for a factory in Turin during the day and builds race cars at night. You're looking at the frame's back end.

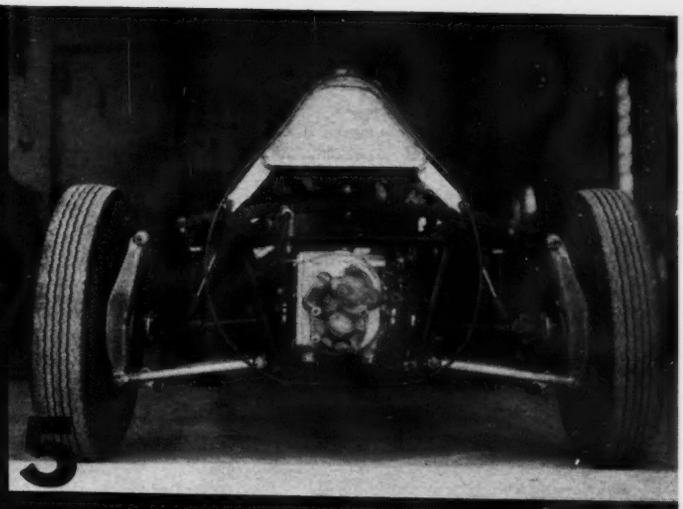
3. The first trial run with the body fitted took place late on a very rainy evening, yet Weitmann was able to get this fine shot at 1/250 of a second on Royal X Pan film. Trips was delighted with the TCA's handling, but plans a number of experiments with the car, including coil instead of leaf front springing.

4. The burly gent in earnest discussion with Trips is Umberto Fantuzzi, who for 30 years has built racing-car bodies for Maserati and Ferrari. Because of its resemblance to the 330-pound Umberto, his body design for the Ferrari Squalo (SCI, September, 1959) earned the fitting nickname of "Fantuzzi on wheels".

5. Transverse leaf springs and Koni shocks have been specially built to match Colotti's requirements. Drive half-shafts are made up of Auto Union 1000 and DKW 750 parts. When and if the DKW 750 box is tried, its inboard brake mounting will replace the Fiat 600 units now used outboard. Front brakes are Auto Union.

6. In his fascinating workshop, far neater than most in Modena, Fantuzzi (not shown) made the TCA body. It's in four parts, which come off in 3 or 4 minutes with the aid of special British-patent rubber attachments. Knock-off wheels are by Amadori. The bodies in the back are for de Tomaso's Fiat-powered Isis Junior.

4



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6

DOLIN

CLASS E CHALLENGER

by George Moore

A combination of money, talent and experience has produced an artfully-crafted Porsche-based special that would do credit to any European factory team.

► One of the latest invaders of the Class E modified ranks is the Durlite Mark III. This new challenger carries only 975 pounds, is pushed along by a 1600 cc double-overhead-cam Porsche engine, and is going to give considerable argument to the fundamental idea that the more displacement you have the faster you go, the more races you win, and so on.

The Durlite Mark III is a successor to two previous models created by an Indianapolis body builder named Bob Webb. Webb first appeared in SCI (August '59) when he brought forth his original Spyder-type competition car. While this smooth-looking version of a Porsche RS represented a tremendous piece of craftsmanship, it was still handicapped to a degree by being fabricated on a limited budget. The Mark III suffers from no such deficiency, since the project was financed by a pair of wealthy racing driver sportsmen, Dean and Dave Causey, with instructions to build the finest Class E car possible.

Webb's previous experience with his Durlite specials, the metal and frame work on Brooks Stevens Excalibur twins, plus some Indy roadster panel forming established in his mind just what he wanted in a chassis before he ever picked up his torch. The frame was to be deep-truss tube, but there was to be a change in the steel utilized. Formerly he had worked with chrome-moly. However, he considered this too rigid, so decided on a mild steel with the two large bottom rails having an o.d. of 1½ inches and .039 wall thickness. Mild steel does not have the rigidity of chrome-moly, but it is being used regularly by Lotus and Elva, and a builder can put complete trust in the welds. The only way to be sure a chrome-moly weld is good is to magnaflux it.

The 67-pound frame consists of four main rails. The two top tubes are 1 inch in diameter, with the same wall thickness as the bottom rails. Truss construction is exceptionally deep, as the bottom rails are attached to the belly pan and the top rails are in line with the top of the body. To add a bit to the rigidity, the belly pan carries a portion of the stress by being riveted to the frame. One-inch cross bracing is liberally employed, with the front members carrying the transverse torsion bars like an Indianapolis roadster.

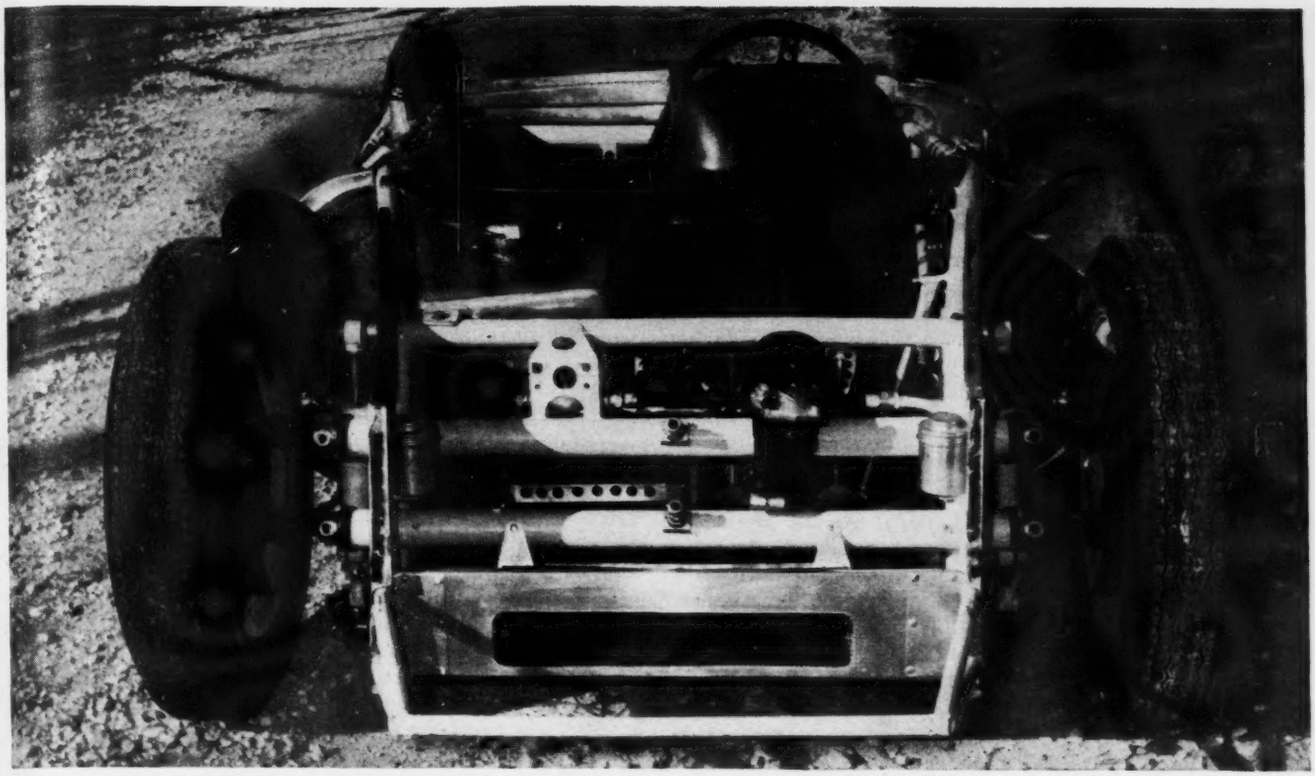
A set of RS trailing arms is used at the front, preventing the use of Indy-type weight jacking devices. A slot has accordingly been cut at the midway point in the front of the cross tube, and a bolt and nut arrangement developed to change the static height of the front end. To change the position of the anchor, the nut is backed away from the tube, and the bolt, which is fastened to the bar, is moved to the desired position. Then the nut is tightened to hold the bar in place.

In the rear, a stub frame carries the transmission, and just forward of this appendage is an oval ring which carries the engine. The engine and transmission assembly can easily be separated from its tubular mounting base by removing six bolts, and the entire rear end including the wheels rolled completely away from the rest of the automobile. The rear suspension system also features transverse torsion bars, but due to crowded conditions they ride out in the fresh air.

The control sensitivity of Porsche's independent rear swing axles is probably famed the world over. When working on the ragged edge, chauffeurs of the RSK series report it handles in a somewhat now-you-have-it – now-you-don't manner. This control, or lack of it, didn't please Webb in the least, so he gave the front wheel alignment 1½ degrees more caster than the K models to get away from the necessity of that feather-fingered touch. The added caster requires a bit more work to steer, but the Mark III will give some warning before letting go completely, and it is felt that the tell-tale safety factor is worth the extra effort.

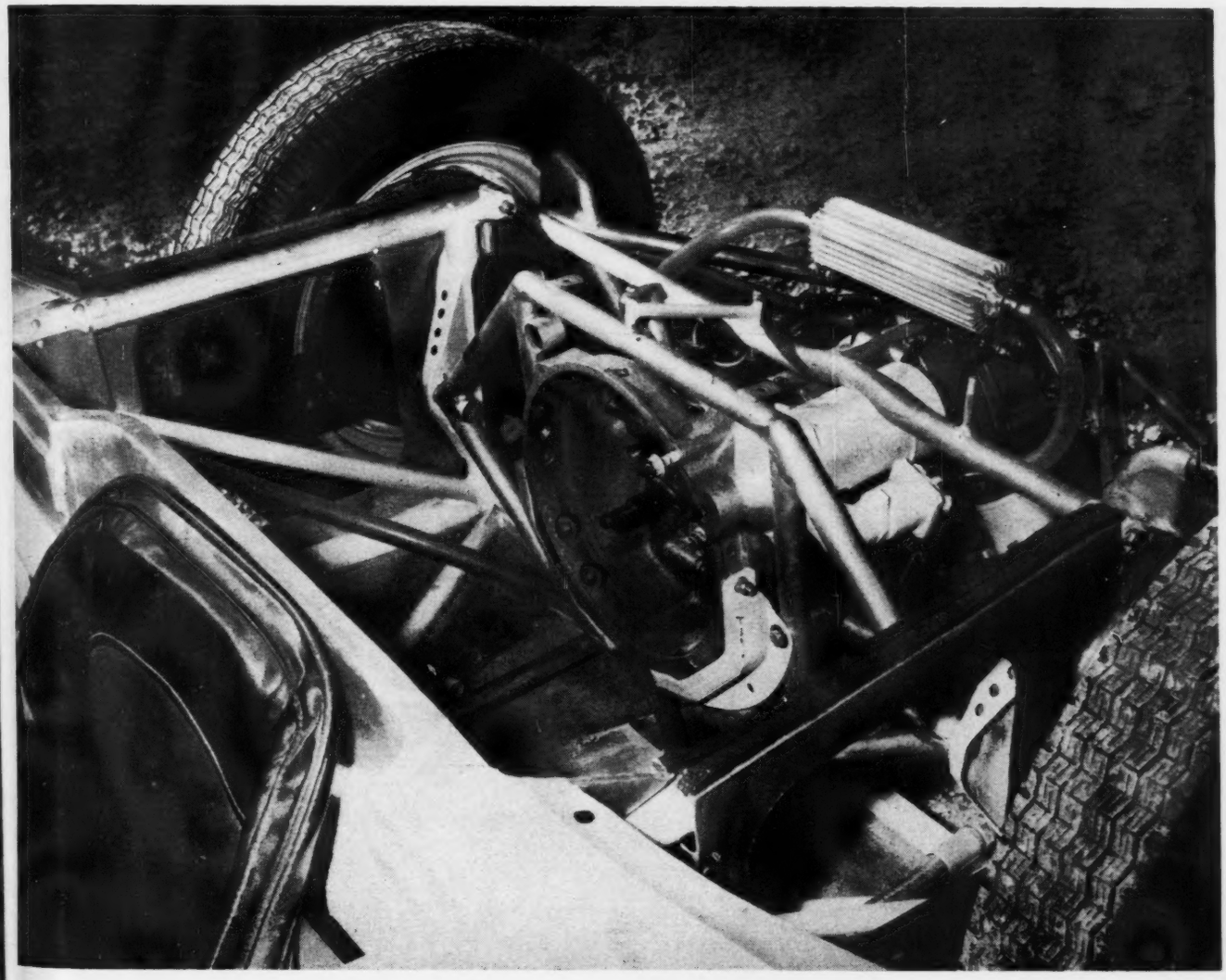
An interesting sidelight is that each wheel assembly in-

(*Continued overleaf*)



Suspension tuning on the Porsche trailing arms is made possible by moving the torsion bar anchorages through slots cut in the two lower cross tubes.

Sub-frame carries the transmission while engine proper rides ahead on tube mount. Power package and wheels can be removed by undoing six bolts.



(*Continued from page 62*)

cluding trailing arm, brakes, wheel and tire weighs two pounds more than the frame. There is a ½-inch front anti-roll bar, front shocks are Monroe with 50-50 valving, and camber is set at zero degrees.

Rear suspension adopts the low-pivot principle which originally found such favor with Mercedes-Benz. Here everything is fabricated with the exception of the splined half-shafts and universal joints. The swinging arms are made from sheet metal and boxed for torsional strength. On the inboard ends the pivotal eye carries a floating bushing to assure freedom of movement. On the outboard ends, the top of the box section has been dished away to accommodate the axle housing, then reboxed by inserting a concave plate between the side members of the arms. The system picked up four pounds over non-low-pivot arms, but the additional weight was worth it in improved handling.

The automobile was ultimately sold to a well-known Indianapolis Porsche pilot, Chuck Rickert, who took his initial ride in it at the Nassau International go last December. Since final assembly actually continued to the time they were loading it on the trailer, he never had a chance to feel out the job on home ground where changes could have been made to remove any unexpected bugs. As things turned out, a wheel bearing problem developed. Then a keeper falling into the engine negated enough practice time to prevent working the chassis combination out completely.

The 18 laps of the race he was able to complete were sufficient to indicate that the design of the Mark III is on the right track. At the point in the Nassau layout where the course goes into a 30 mph corner, Rickert found the car tended to push the front end a bit. On very slow corners the understeering characteristic stayed with him, but on faster turns, he could work up to a feel of neutral steering. And where he negotiated a wide "sweeper", with everything turned on, he could feel a slight bit of oversteer setting in.

Deep-finned alloy brakes from the Le Mans RS have been transposed to the new machine. The radial finning is liberally drilled with 5/16-inch lightening holes. Porsche racing wheels are used, which feature alloy rims and a steel center section for structural strength.

Tires in the past have been critical with Porsches, as not all tread patterns seem to give the necessary stability. Webb has found that Continentals are the only type to date which give this automobile good tractive effort. Without Continentals, the Durlite tends to change lanes at speed, and also will not hang into the corners as well.

An especially important point with trailing-arm suspension and low-pivot rear axles is the front end geometry. Nearly-equal-length tie rods were desired, so the Porsche steering gearbox was moved a bit more toward the center of the chassis. Linkage layout is all Porsche, including a Thermoid U-joint at the bottom of the steering shaft. The cockpit conforms to minimum F.I.A. dimensions and contains a deep bucket aluminum seat with a 7½-inch fore-and-aft travel. The instrument panel is bolted to the frame, holding a cluster consisting of an 8000 rpm tachometer, 160 mph speedometer, and an oil pressure and temperature gauge.

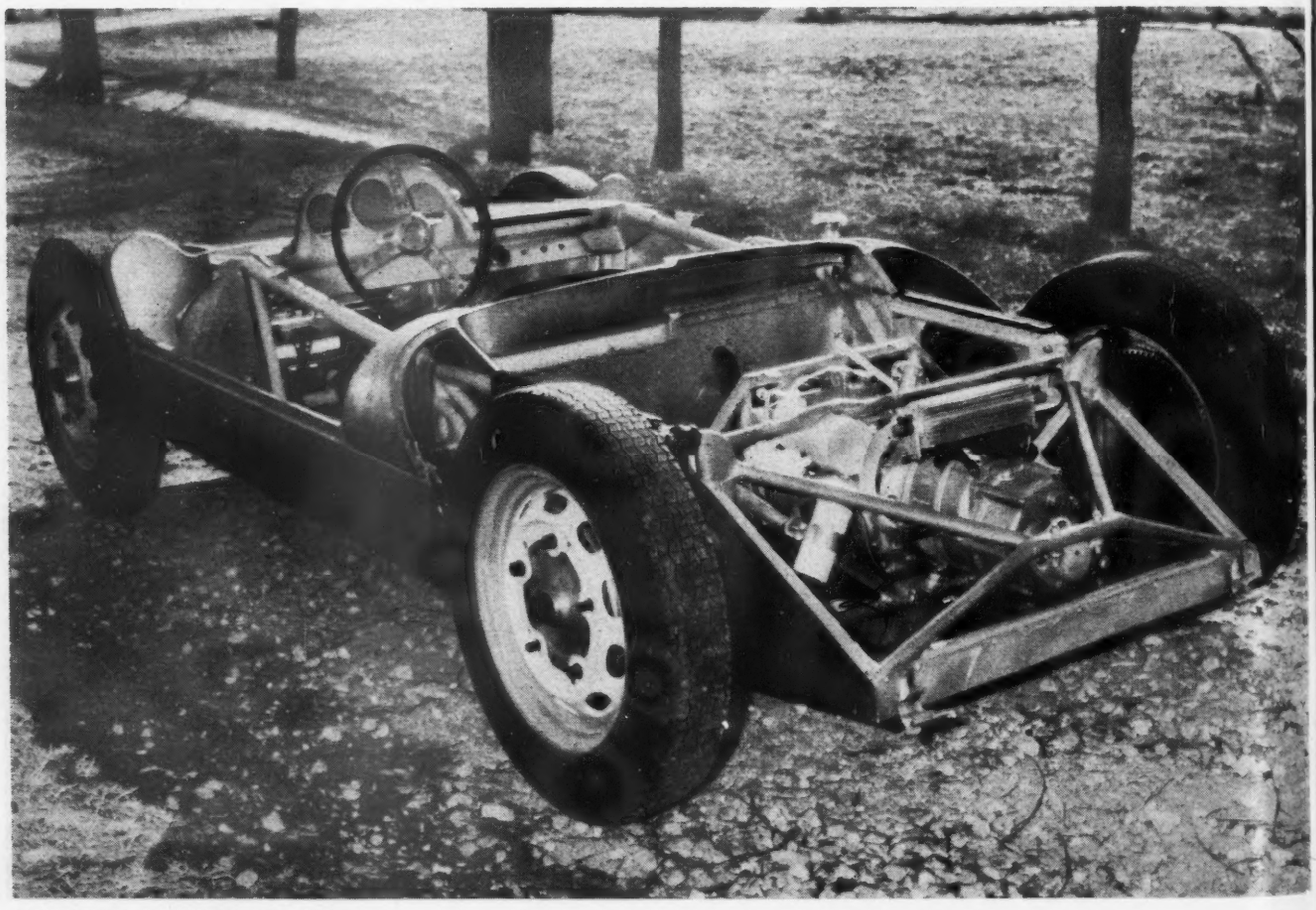
The body on the Durlite was fabricated with the idea of keeping work at an absolute minimum. The car's styling is the essence of simplicity, yet is pleasing to the eye. Webb handcrafted the envelope-type body from 0.40 gauge 3001 alloy aluminum, keeping the entire skin down to six pieces.

The nose and rear deck sections employ the common construction principle of being integral with the fenders. The two units are hinged so they can swing forward or rearward to lay bare the interior of the chassis. The side panels, plus two doors, are separate. Only the door on the driver's side swings out and down, as the one on the passenger's side is held snugly in place by Dzus fasteners.

As previously mentioned, the underpan carries part of the

(*Continued on page 91*)

Stripped for servicing, the Durlite Mark III's simplicity belies the sophisticated engineering and workmanship that made its production possible.



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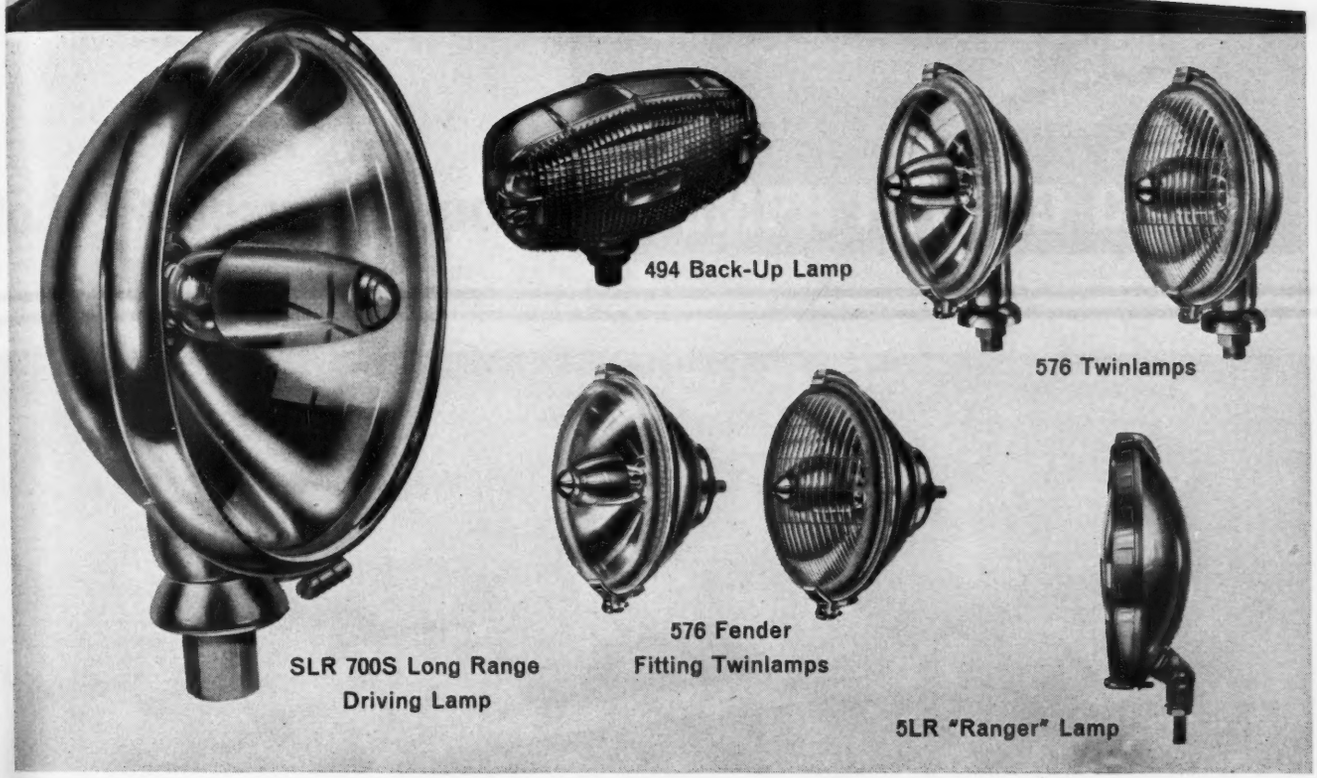

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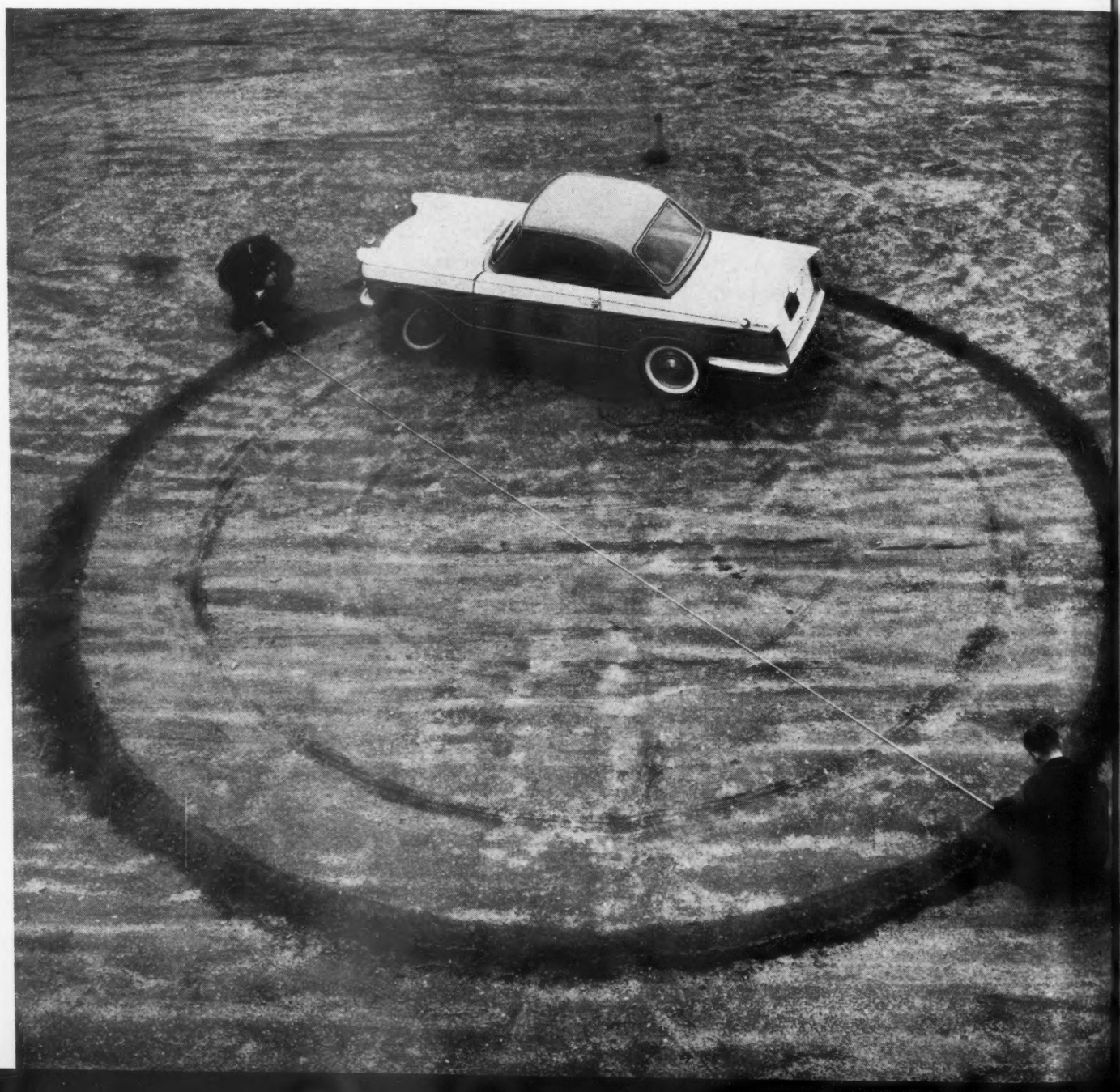
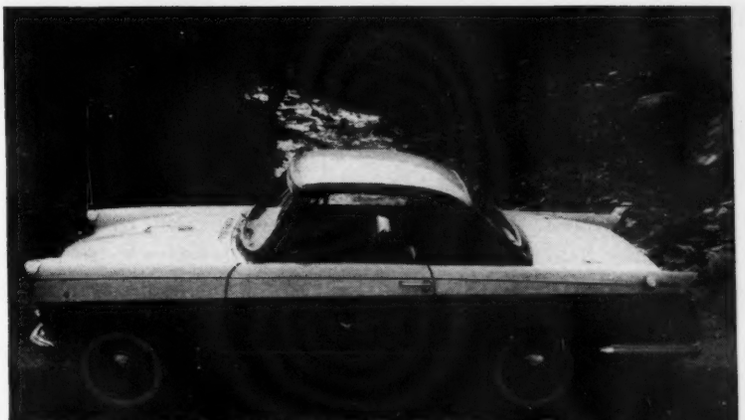




Road Research Report: TRIUMPH HERALD Coupe

► First of Britain's new automotive generation to go into production, the Triumph Herald is a congenial mixture of conventional and novel features. Conventional? The engine is in front, it's cooled by water and its four cylinders are in-line and upright. The body is separate and distinct from the cruciform or X-type frame.

Novel? The same body's major assemblies are all bolted on. There are no welds to inhibit replacement or repair. The rear wheels are sprung independently (by swing axles, radius rods and a transverse leaf spring) to give greater comfort and traction. The Herald turns around in under 26 feet between curbs, so tight you suspect that the inside rear wheel must be going backward. There are no grease fittings (your Triumph dealer need see you but once every 6000 miles), though the front fenders lift up with the hood to give unlimited access.

While Italian styling is no longer novel on British cars, the Michelotti Heralds are a far cry from the staid Standards (that were and are sold here as Triumph Tens). You may like it or not as you see fit, but at least it has stopped in its tracks a British habit of dowdy devices in dowdier packages.

THE COCKPIT CAPSULE

In an era that's glutted with cars designed and dimensioned for a mythical Mister Average, it's a happy surprise to find a car which makes allowances for individual needs and desires. Instead of a reluctant 4 inches of seat travel, the Herald's engineers have provided the driver's seat with 64 possible positions, and with none of the cost and complexity of six-way power seats. Among these 64, nearly anyone should find a suitable one. How are so many possibilities available? By providing a few alternate positions in several pertinent areas. To begin with, the entire seat slides through a range of 5¼ inches with eight notches to choose from. All Heralds are two-doors, and each seat tilts forward (and inward without interfering with the doors) for access to the rear. Where the back of the driver's seat frame touches down on the slide rails, two eccentric rubber spacer blocks provide four possible rake angles, ranging from lounging 'way back to very upright. Five, in fact, for you can slide the blocks forward out of the way.

The crowning touch is this: the hinge bolts under the fronts of the seats can be installed through alternate holes in the rather thin mounting brackets. This may not sound very significant but it's a blessing for long-legged drivers. It lets them raise the front of the seat an inch to provide that much-needed thigh support. On a long trip this can make worlds of difference, subtle as it sounds. The price paid for this is that clearance between the wheel rim and the seat is cut from 6 to 5 inches but the "chair height" increases correspondingly from a respectable 11 inches to an even foot. Headroom is unaffected. The only drawback to this happy and unusual contribution to driving comfort is a minor one. The two hinge bolts are awkward to reach (though wrenches in the standard tool kit do fit) and the job takes some ten or fifteen minutes. Offhand, we suspect that only half of the Herald buyers will ever hear of this adjustment and that half of them will never get around to trying it.

Of course, other cars have been sold for years with a note in the service manual that the seat mounting bolts can be replaced with longer ones and wooden spacers installed to lift the seat higher, but we don't believe that it's ever been so inexpensively easy for the owner to effect such an adjustment himself since Jaguar gave up the little crank on the front of the Mark V seats.

ADJUSTMENT PLUS SAFETY

To add icing to this mobile cake, the steering wheel column has some six inches of adjustment in it. As with the seat movement, it isn't accomplished with any of the fancy splined shafts and quick-release locks of exotic sports cars. Instead the column is in two parts, each with a half-round section where they join. Safety is inserted here too, as mentioned earlier. If the clamp-

ing bolts are torqued correctly to a mere 4 to 6 pound-feet, this joint will act as a friction shock absorber in the unfortunate event of a collision. What's left of that 6-inch adjustment allows your body to decelerate more slowly than the car itself.

The driver is not S-T's only concern; the passenger is looked after too. Though it's not appealingly soft to the touch like "safety" padding, the entire dashboard is pressed from a fiberboard material which will collapse under heavy impact yet is rigid enough for everyday abuse. Because of this feature, the dashboard's shape cannot be criticized. In fact its overhanging lip can be praised for thoroughly shielding the windshield from stray light from the instruments at night. Its surface is not glossy so it doesn't reflect sunlight either, an even more unusual contribution to safety.

Crash possibilities are grisly to talk about, but if more cockpit capsules were designed with crashes and passenger safety in mind, such talk wouldn't be so unattractive. Ignorance may be bliss, but it's poor protection. We hope in this regard that other manufacturers soon follow Standard-Triumph's many leads.

HANDLING AND RIDE

The Herald may be short on power but it's long on handling, enough so that it nearly qualifies as a sports car. The rack and pinion steering is quick, precise and exceedingly light, though bumps in the road telegraph themselves to the wheel rim disconcertingly. The 51/49 weight distribution gives gentle understeer right up to the limit. The Herald, incidentally, must put the lie to the old saw that cars with swing-axle i.r.s. always oversteer.

Our speed around the 400-foot Test Circle was limited by the power and the gear ratios. Third is a big 70 percent jump from second and the Herald just wouldn't pull too well in the 40's.

On twisting country lanes, the Herald is a positive delight, slipping from one gentle drift to another with a deftness that flatters the driver and calms the passengers. We enjoyed it like no Triumph we'd ever driven before. For a pleasant surprise, we found the recommended tire pressures quite satisfactory for highly spirited driving, though raising them 6 psi helped us get away rapidly for the acceleration runs and is probably more economical for turnpike cruising in the seventies too.

The ride is very comfortable but on irregular surfaces there is much suspension noise. So much so, one is apt to think the ride isn't so good. Perhaps the noise level is raised because the body panels resonate, or perhaps the many nylon bushes transmit more noise than would rubber ones. (But the latter would hurt the precise handling.) Another noise source is the final-drive housing mounted to the frame, though this is quieter than the transmission's indirect gears. It's subdued enough that it doesn't bother, but when you put the Herald in neutral and coast, there is a detectable drop.

PARKING

We don't know what got into the S-T engineers but they've incorporated a fantastic steering lock in the Herald. The test coupe turned around in a bit under 26 feet curb to curb. (The factory claims 25, but we're still impressed.) To do this the wheels turn some 50° and of course the Ackerman geometry gets left behind, there being plenty of tire scrub at the outside front corner. It turns so sharply that we were surprised to find we could keep circling in second gear. One thing is certain, we used plenty of parking slots that looked a complete waste of time to conventional eyes.

This ability to park in tight spaces without winding your arms in a knot is augmented by sensible, practical bumpers. Small cars can't afford the weight of the monstrously heavy chrome shields of standard-sized American cars. Instead they must use ingenuity. Triumph does it this way: thick rubber (half-inch plus) covers a steel tube across the Herald's front, to which the bumper guards are welded. Despite this welding, the latter can too-easily be bent backward. Also rubber-protected, the rear bumpers are more conventionally mounted to the tail-end of the separate box-section frame. The rubber is white. This is more decorative than black, but like white sidewalls it requires more cosmetic attention.

MAINTENANCE

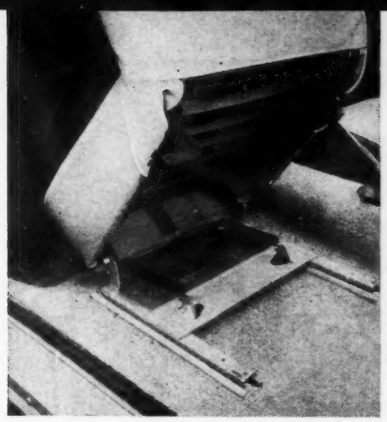
Washing and polishing is about all the Herald owner need concern himself with. There aren't any lube fittings at all on the chassis and only a couple on the power plant. How often do they need attention? At 12,000-mile intervals! The front suspension's lower swivel joints spoil this by demanding refilling with gear oil at half that distance and, of course, the engine oil should be changed even more frequently, especially if the car is used mostly on short trips. For long trips at last we have here a car which need only be refueled – nothing else.

The secret lies in the extensive use of rubber and nylon bushes instead of the conventional bronze ones. Early Heralds in England had a reputation for squeaking but we in America are spared such teething problems, as the Heralds have been in production now for a full year. Isn't it ironic that a car should have such generous accessibility when it needs so little maintenance? The hood and front fenders lift up as a unit when the Michelotti-emblem-latches are unfastened, pivoting about the front bumper. In case of head winds, there is a short stay to prop up this massive unit, but normally it goes "over center" and stays up of its own accord. The luggage-handle-like hood ornament is extraneous. It's really easier to lift a corner of the hood itself.

COMPLAINTS

There are a few details which disappointed us in these cars. The wall-to-wall carpeting (a clever phrase they've thought of) is thick and sound-absorbing, but its edges turn up unattractively. The sealing around the windows of the coupe was very poor at the rear corners, despite bulky rubber strips. The headlight shrouds add air resistance which cuts both speed and

(Text continued on page 84; data overleaf)

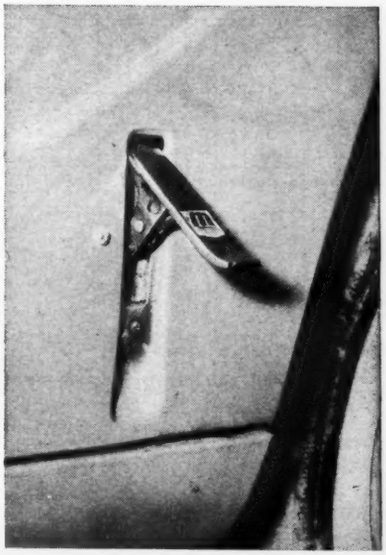


Driver's seat adjusts vertically too. Hinge bolts lift front, rubber eccentrics the rear.

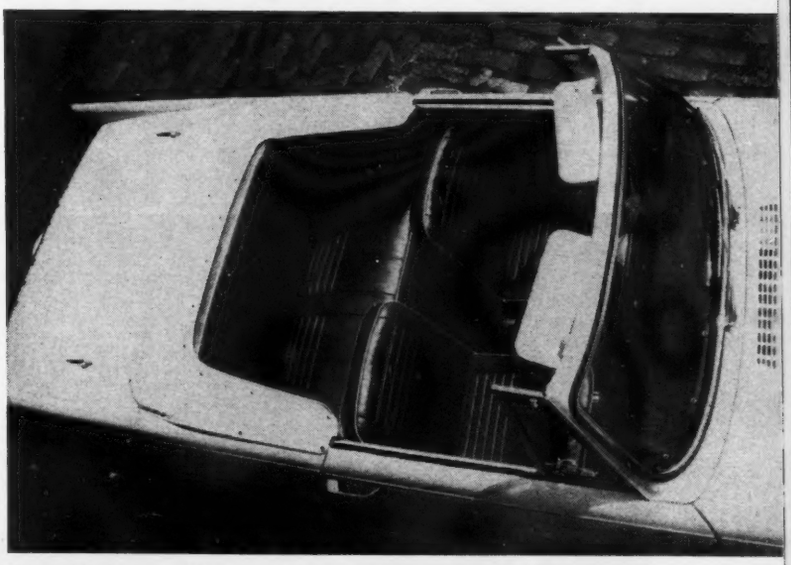
With excellent ground clearance, the Herald rolls slightly as the all-independently-sprung coupe is pushed toward gently-understeering limit.

Neither snow nor sleet shall keep these road-testers from their appointed rounds. Even in late Spring, Alps provided wintry conditions to prove the heater satisfactory. Windshield wiper pattern shown here is reversed on right-hand-drive cars for U.S.

Entrance through wide doorway is easy. Deeply-stamped floor gives chair-height seats with low roof.

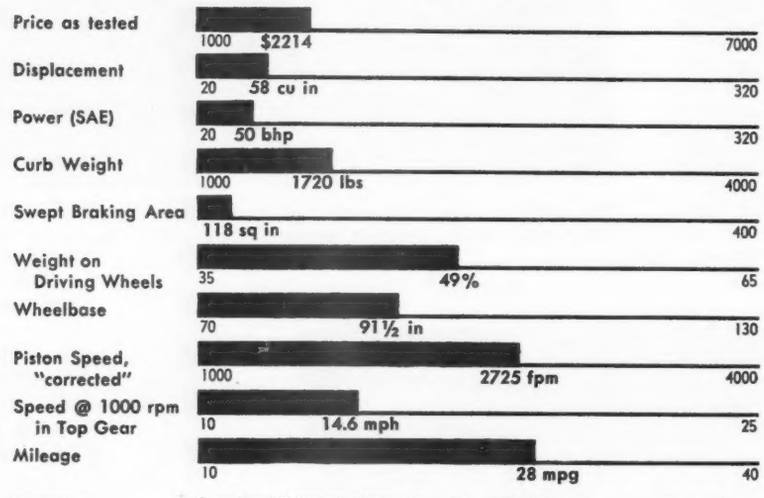


Hood latches (one each side) double as body designer's trademark. Takes two to tilt hood.

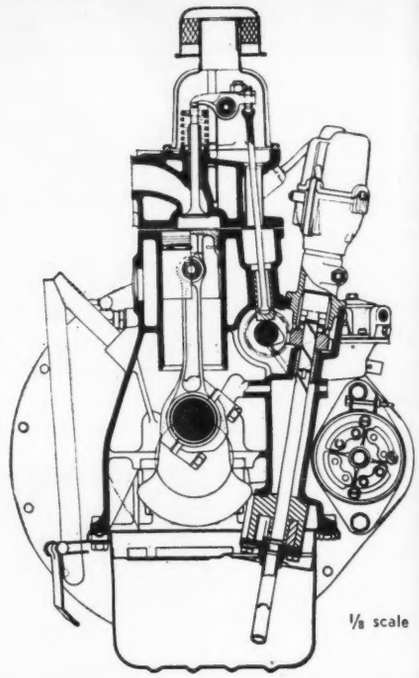


Convertible has easy-fold top, windows and enough headroom in back to justify seat cushions there as standard; this is not so on rakish coupe.

Road Research Report:
TRIUMPH HERALD Coupe



Importer: Standard-Triumph Motor Co., Inc., 1745 Broadway, N. Y. 19, N. Y.



⅛ scale

ENGINE:

Displacement	58 cu in, 948 cc
Dimensions	Four cyl, 2.48 x 2.99 in
Compression Ratio	8.5 to one
Power (SAE)	50 bhp @ 6000 rpm
Torque	51 lb-ft @ 4200 rpm
Usable rpm Range	1400-6750 rpm
Piston Speed ÷ √s/b @ rated power	2725 ft/min
Fuel Recommended	Premium
Mileage	25-31 mpg
Range	210-260 miles

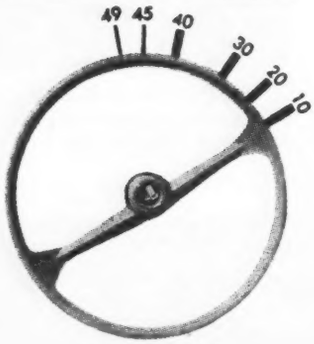
CHASSIS:

Wheelbase	91½ in
Tread, F, R	48 in
Length	153 in
Suspension: F, ind., coil, wishbones, antiroll bar; R, ind., swing axle, leaf spring.	
Turns to Full Lock	1.9
Tire Size	5.20 x 13
Swept Braking Area	118 sq in
Curb Weight (full tank)	1720 lbs
Percentage on Driving Wheels	49%
Test Weight	1980 lbs

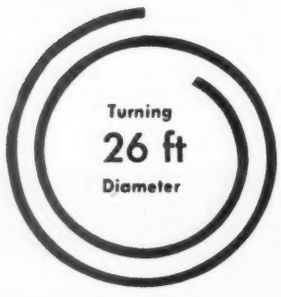
DRIVE TRAIN:

Gear	Synchro?	Ratio	Step	Overall	Mph per 1000 rpm
Rev	No	4.27		19.44	3.4
			—		
1st	No	4.27		19.44	3.4
			74%		
2nd	Yes	2.46		11.20	5.9
			69%		
3rd	Yes	1.45		6.62	10.0
			45%		
4th	Yes	1.00		4.55	14.6

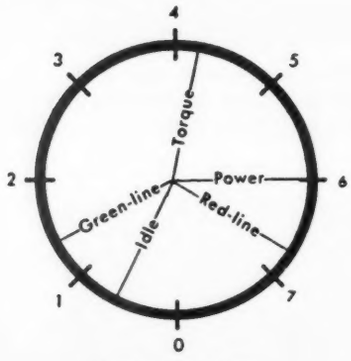
Final Drive Ratios: 4.55 to one std., 4.875 for sedans.



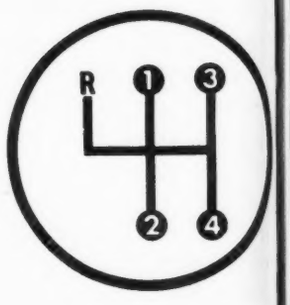
19/24 psi, F/R
Steering Behavior



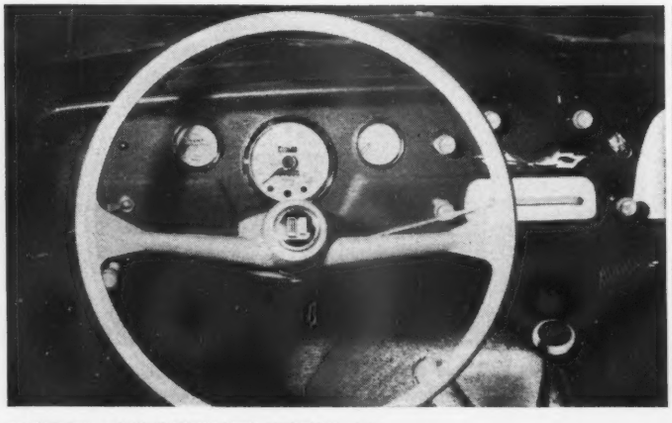
Turns to Full Lock

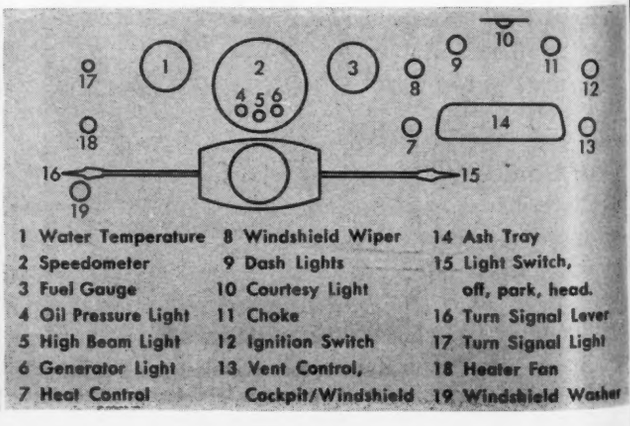


Engine Flexibility

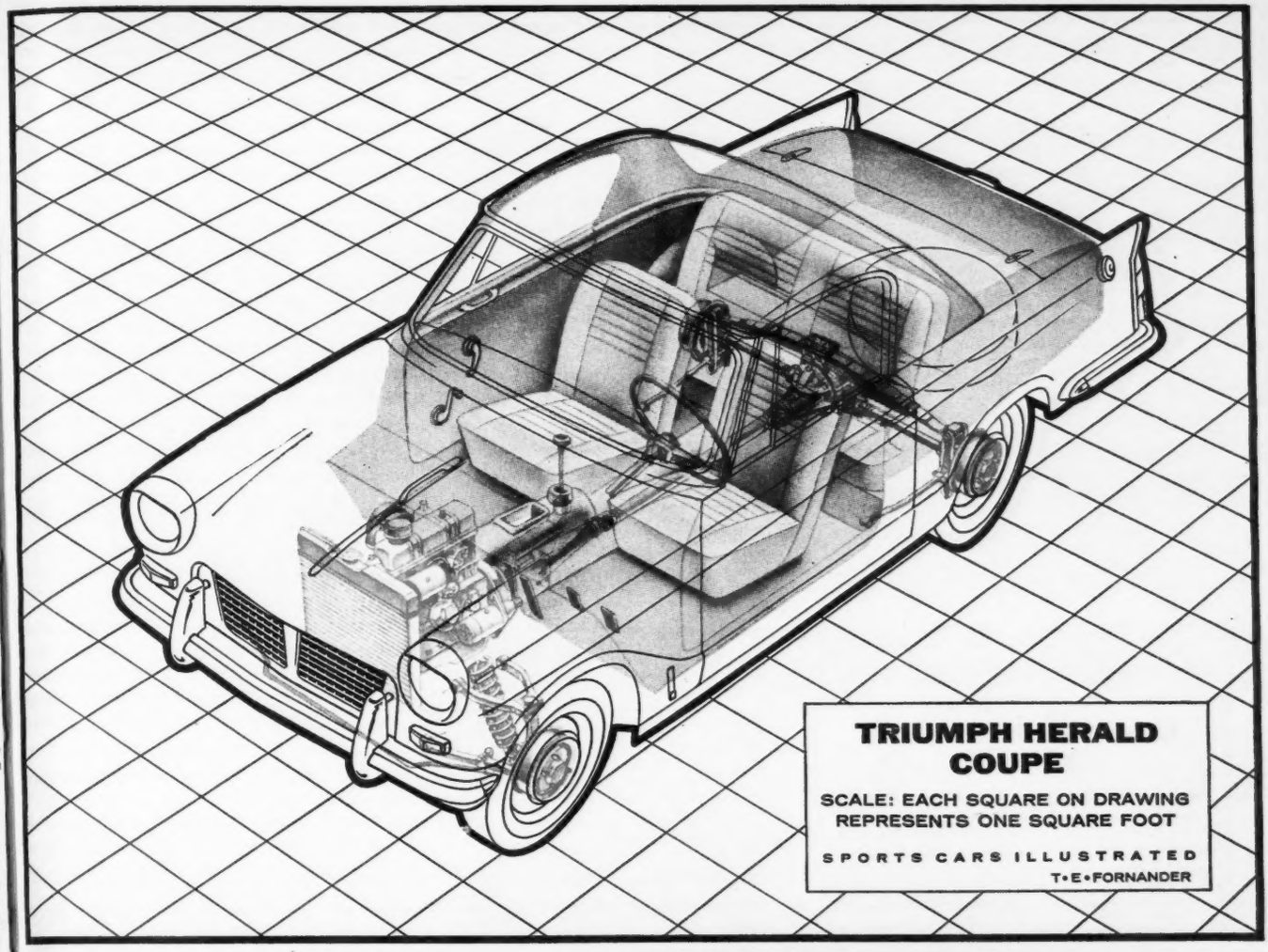


Shift Pattern





1 Water Temperature
2 Speedometer
3 Fuel Gauge
4 Oil Pressure Light
5 High Beam Light
6 Generator Light
7 Heat Control
8 Windshield Wiper
9 Dash Lights
10 Courtesy Light
11 Choke
12 Ignition Switch
13 Vent Control, Cockpit/Windshield
14 Ash Tray
15 Light Switch, off, park, head.
16 Turn Signal Lever
17 Turn Signal Light
18 Heater Fan
19 Windshield Washer

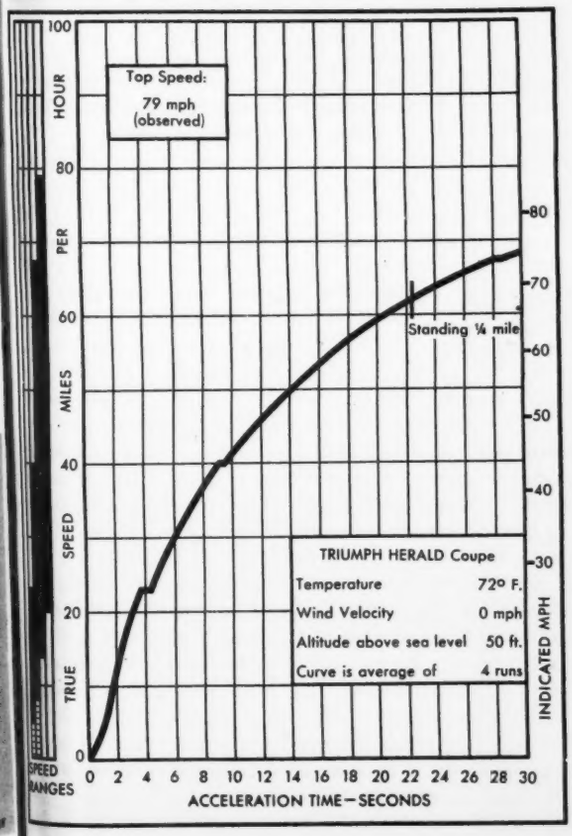


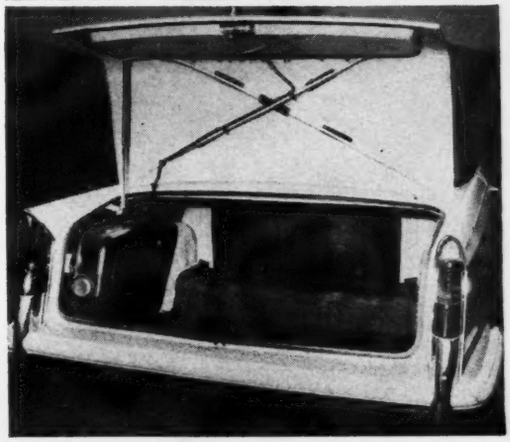
TRIUMPH HERALD COUPE

SCALE: EACH SQUARE ON DRAWING REPRESENTS ONE SQUARE FOOT

SPORTS CARS ILLUSTRATED

T•E•FORNANDER


Top Speed:
79 mph
(observed)
Standing ¼ mile
TRIUMPH HERALD Coupe
Temperature 72° F.
Wind Velocity 0 mph
Altitude above sea level 50 ft.
Curve is average of 4 runs
TRUE SPEED MILES PER HOUR
INDICATED MPH
SPEED RANGES
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
ACCELERATION TIME—SECONDS



In a fantastic bash through the crags of Sicily, Porsche made it two out of three against Ferrari in the '60 races so far. When he created the 44-year-old contest that bears his name, the late Vincenzo Florio surely realized that . . .

ROADS ARE FOR RACING

by Jesse Alexander

Cliff Allison stands biting his fingernails as he awaits the verdict from Phil Hill (over fender) and Richie Ginther as to the amount of damage to his car after he deposited it in a ditch during practice run.

► To experience the Targa fully, one must come several days prior to the race and drive to the fantastically picturesque seacoast spot of Cefalu, 15 miles from the Targa start-and-finish line. Here, in the single acceptable hotel in town, can be found the race headquarters of both Ferrari and Porsche. I'm sure that Cefalu is never quite the same after the racing teams depart; there's an atmosphere with a flavor of the Carrera Pan-Americana and the Mille Miglia all mixed together. Drivers who have never seen the Targa circuit usually come to Sicily at least a week beforehand. Mercedes in 1955 spent three weeks in preparation, and in 1960 all of the Ferrari and Porsche drivers were on hand six days ahead of time, learning and re-learning (as is the case with many) the course in borrowed or rented Fiats and Alfa-Romeos. Ferrari brought a four-cylinder Monza solely to be used in training (Paul Frere eventually crashed it without hurting anything but his feelings). Hans Herrmann told me, "The course could be learned like the Nürburgring, but with a minimum of three weeks' continual training." After having done almost twenty practice laps, Phil Hill admitted after the race that even in the last hours of the Targa he was still driving some of the circuit on sight. With only four hours on one day in which the road is officially closed, practically all Targa practice has to be done with regular traffic.

One of the most interesting things about the World Sports Car Championship is the variety of circuits on which the six annual events are run. Buenos Aires, Sebring, Le Mans, the Nürburgring, Goodwood and the Targa Florio each have very specific requirements laid down by the nature of the circuit. Naturally, certain courses favor certain cars and not all sports car constructors participate in all of the Championship events. The outstanding exceptions are Porsche and Ferrari, two names now joined in their annual battle for the world title.

Porsche comes to Sicily's Targa Florio knowing that of all the half-dozen races, this one can easily be theirs – an event in which a 1.5- or 1.6-liter Spyder can demonstrate superiority in the most strenuous road competition of all. As always, luck plays a leading role in the Targa, but Porsche spares no effort in an annual effort to beat Ferrari on his home ground. 1960 saw the bi-polar struggle enlivened by the presence of a lone 2.8-liter "Birdcage" Maserati driven by Umberto Maglioli and Nino Vacarella, with the rest of the field made up of a horde of Italian entries including everything from vintage Fiat V8's to the latest Conrero Giulietta.

The 44.6-mile circuit bears the distinction of being host to the oldest road race in the world, with a glorious history filling the pages of automotive journals since the turn of the century. Laid out almost entirely in the wild Madonie mountains near Palermo, the route of the Targa consists of winding badly-surfaced roads leading from Cerda up into the mountains through towns and groups of farm houses where the living standard is one of the worst in the world. In spite of his poverty the average Sicilian peasant almost always wears a smile, and when the Targa Florio comes around each year, he and his family take to the side of the road not only to watch in wonder but to cheer as well, to cheer Maglioli, and to cheer the red Ferraris, even when they are driven by *estranere* – foreigners. The Sicilians have also come to admire the Porsche, with the silver German cars now a Targa tradition.

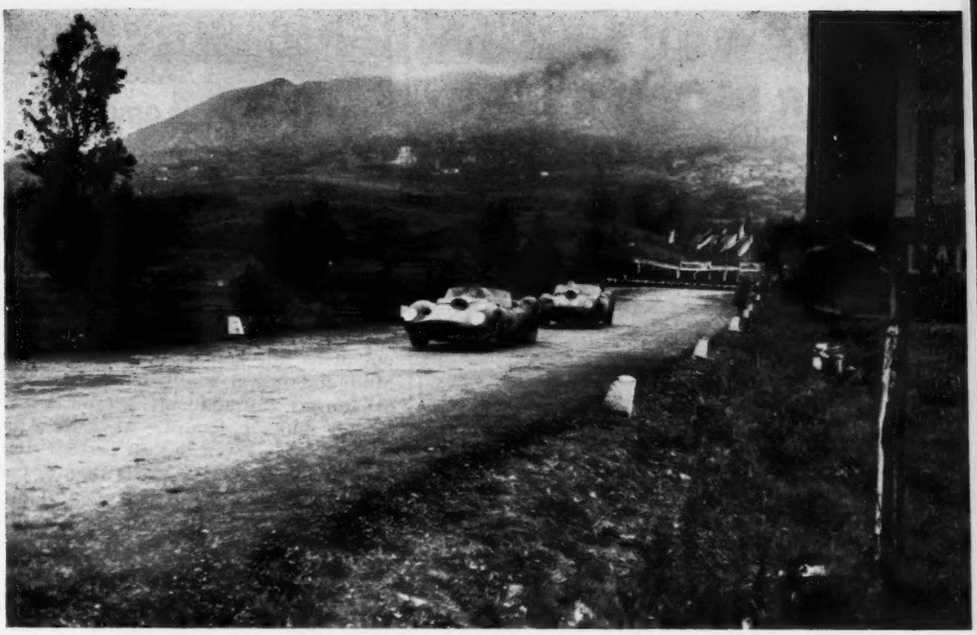
There are three ways to reach Sicily: you can drive the entire distance if time permits and see southern Italy – through the province of Calabria which is the heel and toe of the Italian boot; you can drive as far as Naples, whence Palermo is an overnight boat trip with your car on board. Perhaps the easiest way is to fly, with Alitalia flights out of Rome and Naples serving Palermo or Catania several times daily. Having made the road trip already, I chose to fly this year and rented a Fiat 600 in Palermo.

(Continued on page 74)

44th Targa Florio
May 8, 1960

1	Bonnier/ Herrmann	Porsche RS 60 (59.107 mph average)	7:33:08
2	Trips/ Hill	Ferrari 2.8 V6	7:39:11
3	Gendebien/ Herrmann	Porsche RS 60	7:41:46
4	Mairesse/ Scarfiotti	Ferrari 2.4 V6	7:44:49
5	Barth/ Graham Hill	Porsche RS 60	7:59:11
6	Strahle/ Linge	Porsche-Abarth Carrera	8:10:06
7	Rodriguez/ Rodriguez	Ferrari 2.4 V6	8:16:52
8	Strahle/ Kainz	Porsche Carrera	8:19:54

Fastest Lap
Bonnier (Porsche) 42 minutes, 26 seconds



The Allison/Ginther V12 Ferrari is trailed by the von Trips/Hill V6 along the short straight that leads away from the pits. The V6 finished second overall, while the bigger car ended its race in a ditch. For all its deadliness, open-road racing is still the most spectacular form of the art to see and hear. It is still the truest test of any machine built to win on any type of circuit.

First-place Porsche with Joakim Bonnier at the wheel sends its deep, chugging exhaust note floating through the Sicilian hills as it goes on its winning way. The Targa, with its rough roads and countless bends, favors the smaller, nimbler car. Proof of this can be found in past Porsche showings in this, the roughest of all road races.

"Go, you, and don't do likewise," von Trips seems to be saying to his teammate Phil Hill as he hands over one rather battered V6 Ferrari. Their joint efforts were rewarded by a second place. This is a far better showing than last year for the big red cars from Italy's foremost builder of real racing car. Improved handling has helped.

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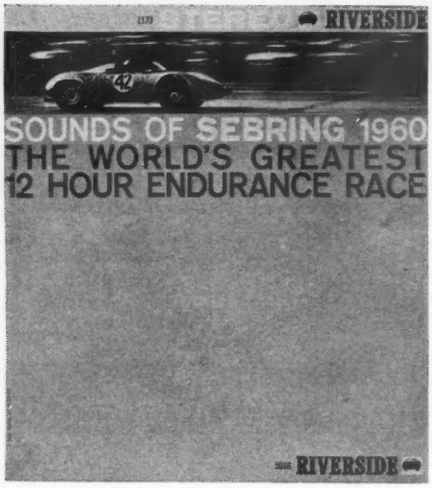

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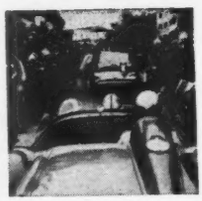

TARGA FLORIO

from page 73

ing in a conditioned state of mind inhibiting "nine-tenths" driving, even in the race.

Unlike the Nürburgring, a driver cannot use the gutters of the road, for their ragged and uneven edges will throw a car violently out of its line and into a disastrous crash. Mud and gravel is often on the road; a dry surface can suddenly become wet; fog is still another hazard. As Cliff Allison said, "In the Targa, it's 80 percent driver. If he knows the course better than the next fellow and his car is well-suited to it, he has a tremendous advantage. He must know — must memorize — every kilometer and always expect the unexpected."

Poised on the road leading to the starting line were four Ferraris and three factory Porsches. Interspersed among them were several Grand Touring Ferraris, three Porsche Carreras, the Camoradi-entered, Maglioli-driven 2.8 Maserati as well as a host of privately-entered Italian sports and G.T. cars Conrero chose the Targa to introduce a space-frame 1100 cc Giulietta-based sports car; Colin Davis was behind the wheel of a Cooper Monaco with a 2-liter Maserati engine (Neither of these two interesting entries finished the race).

The factory Ferraris were a variety of types, no two perfectly identical. Wrecked in training was the latest 3-liter V12 with wishbone independent rear suspension. Cliff Allison had a narrow escape when a tire blew after being struck by a stone. Going out of control in a fast bend at the end of the long Targa straight near the coast, the Ferrari barely missed a stone wall and landed in a roadside ditch, with Allison unhurt but the car badly bent. Last-minute driver pairings put von Trips and Phil Hill into a 2.8-liter V6 Dino single-overhead-camshaft car with wishbone rear suspension. Cliff Allison and Richie Ginther found themselves driving a 12-cylinder with de Dion rear axle, and Mairesse and Scarfiotti were in a 2417 cc V6 Dino with a live rear axle. In addition to these official factory cars, a fourth entry, from the North American Racing Team, was driven by Pedro and Ricardo Rodriguez, another 2417 cc V6 Dino.

Starting at brief intervals, the cars are engaged not only in a race among themselves but against the clock, Mille-Miglia-style. The Bonnier/Herrmann 1678 cc Porsche Spyder went into an immediate lead, which it held for four laps until it came into the pits for a driver change and refueling. The 2.8 Maserati, driven first by Maglioli and later by Vacarella for just two laps, held a constant second place, the difference between the Porsche and the Maserati not exceeding a minute and a half at any time. Surprisingly, when 27-year-old Palermo law professor Vacarella took over from Maglioli the Maserati went faster than ever, its best time being a commendable 44'35", as compared to Bonnier's sensational fastest lap of 42'26". (The Targa lap record is still held by Stirling Moss, who turned a 42'17" lap in 1958 in an Aston Martin.) The performance of the Maserati was better than expected, but Maglioli wasn't completely satisfied with its behavior on the rough road surface, complaining that it was "all over the road." The car used Goodyear racing tires, as do all Camoradi-sponsored entries. Hopes for a possible success were dashed on the car's eighth lap, when a leaking fuel tank put Vacarella out of the race, leaving the car stranded high in the mountains.

Wolfgang von Trips started the Targa while co-driver Phil Hill waited in the pits. On the very first lap, with his front brakes locking, Trips bounced the Ferrari off a wall and lost a minute bending the front bodywork back into shape. On the next lap all four Ferraris came through together, Allison leading, but the Bonnier Porsche couldn't be caught. It wasn't until Phil Hill took over after five laps that the experimental 2.8-liter Ferrari began to lap faster than the Porsche, but the latter's large lead couldn't be whittled down. The Allison/Ginther 12-cylinder was in third place at the end of three laps but Richie Ginther later went off the road, badly damaging the front end, and couldn't rejoin the race.

Hans Herrmann also shared the wheel of a second Porsche Spyder driven by Olivier Gendebien. The third Spyder in the hands of Barth and Graham Hill finished fifth overall, obviously with instructions to hold back in case either of the other two RS 60's got into trouble. All the Porsches ran like clockwork, the drivers not having to work quite as hard as the Ferrari pilots to keep on the road. Their engines were aided by special gearing which allowed a minimum of 3800 rpm to be used and a maximum approaching 8000 rpm. After training it was found that still lower ratios were necessary so the special starting gear of the five-speed gearbox wouldn't have to be used during the race.

As always in recent Targas, performances of the Porsche Carreras have been outstanding. Final results this year found the Abarth-bodied special Carrera, driven by Strahle and Linge, in sixth place. This Carrera is only slightly lighter than the normal G.T. version but is lower and shorter, its chassis being identical to the G.T. The Targa regulations permit drivers to handle more than one car, explaining why Strahle's name appears twice in the results — likewise Hans Herrmann. The pair of Pucci/von Hanstein on a Carrera did a regular job for the first part of the race but did not finish.

The potential danger of the circuit was strongly brought home to George Bauer and Carroll Smith, two Americans who had entered their 1½-liter OSCA in the Targa. Lacking adequate preparation and thorough practice, Bauer and Smith probably didn't realize what they were getting into. Bauer struck a patch of gravel on his second lap, going off the road and turning over several times. He finally came to rest upside-down in a ravine where, after what seemed to be an interminable time, a group of Sicilians rescued him, carrying him in a chair to their house until he could be brought back to the pits for treatment of a possible broken hip. —*JLA*

INTERSTATE HIGHWAYS

from page 27

What construction totals can't reveal at all is the impact of all this activity. Two 20-mile sections look alike on paper, but their effects may be very different if one, say, replaces a twisty, hazardous cowpath, and the other alternates an existing pike. Almost every new road job brings immediate benefit to some local residents and property owners and causes hardship or injury to others. It also has wider, long-term significance for a whole community or region.

WHO'S RUNNING THE SHOW?

It is a matter of simple fact that very little master-planning is being done. And this raises the question of how the new Interstate System is being built. Who makes the vital, far-reaching decisions that ride on every contract?

The nearest thing to an answer is the Bureau of Public Roads. This branch of the Commerce Department is the chief architect, manager, bookkeeper, co-ordinator – and whipping boy – of all federally-aided roadbuilding. It is also the author of the Interstate System, having first proposed it to Congress back in 1939.

Probably with a view to providing some postwar employment, Congress adopted the idea of an Interstate System in 1944 and directed that detailed plans and routes be drawn up for a network not to exceed 40,000 miles. In co-operation with the state highway departments, the B.P.R. drafted these plans (which turned out to require only 37,700 miles) and submitted them to Congress. They were formally adopted in 1947. And, for all practical purposes, promptly forgotten.

At any rate, no funds were appropriated specifically for the Interstate System for several years. Then Congress voted $25 million for 1954 and again for 1955. It was to be allocated to states that would match 60 percent federal money with 40 percent of their own.

LEGAL ROADBLOCKS

What finally got the program off the ground was the famous Clay Committee report of 1954 which was greeted in the headlines as a "$101 billion road improvement program."

For reasons we'll come to in a moment, the Clay plan got buried in a political avalanche, but it did fire public imagination with the vision of a vast highway-building spree. One of its central proposals was that the federal government should pay 90 percent of the cost of the Interstate System, and that the $27 billion job should be pushed through in 10 years.

This set the stage for the Federal-Aid Highway Act of 1956 which upped the System to 41,000 miles and set up annual appropriations for its completion in 13 years. The Bureau of Public Roads was given responsibility for setting standards and co-ordinating the work.

While the Bureau's responsibility – and

(Continued on page 76)

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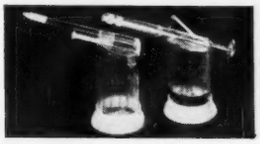

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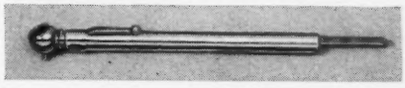

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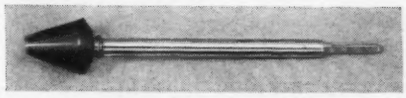

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(Continued from page 75)

authority — may thus appear to be fairly clearcut, it actually operates under a confusing hodgepodge of vague, changeable, and often conflicting orders. While trying to boss multi-billion construction jobs, it must answer — without answering back — to more than four dozen bosses. Some of them occasionally find they can get better mileage out of political detours than from direct routes.

The reasons aren't necessarily dishonorable, and in some cases are clearly unavoidable. Hardly anyone, these days, questions the *need* for centralized, integrated, long-range road planning. But many critical parts of our roadbuilding effort must exist in a kind of legal fairyland whose borders have been hacked out by accident rather than by premeditated plan. Not the least of the roadblocks is a venerable document known as the Constitution of the United States.

Possibly because none of our Founding Fathers ever got stuck in a traffic jam, complete control over road-building functions was reserved to the individual states. Thus while only the federal government can make plans of national scope, it has no power to impose or implement these plans. At most, it can make suggestions to the states about routes, standards, mileages, how surrounding land is to be used, and which roads are to meet at state lines. It can reinforce its power of suggestion, however, by offering to pay part, or most, or all of the cost of building the roads it wants. It has been doing this, since 1916, on three other networks of primary, rural-secondary, and urban-extension roads that now total over three-quarters of a million miles. The device of paying 90 percent of the cost of the Interstate System was written into the 1956 law.

WHERE DOES THE MONEY COME FROM?

Money on this scale can solve almost every problem — except the one about where it's going to come from. There's a wide-spread impression that Congress settled the matter in 1956, but this just isn't so. Nor did it solve another Constitutional obstacle to long-range planning. Even though it seemingly voted future-year expenditures, Congress didn't alter this fundamental rule: anything that can be done by one session can be undone by the next.

Like federal aid, this is a traditional part of our highway scenery. It costs nothing to "authorize" future plans, no matter how elaborate and expensive, and this kind of achievement makes everybody look good.

When the future closes in, however, real appropriations of real money are needed to make good on the authorizations. This may require raising taxes, unbalancing the budget, pushing up the debt limit, or creating new book-keeping devices to conceal what is actually being done. Not uncommonly it produces legislation that states a clear objective in one paragraph, and, in the next, destroys the means for carrying it out. Or Congress may simply fail to act on a money bill, which has the effect of nullifying its previous authorization. The Interstate Highway program has endured all these gambits.

The Clay Committee Report of 1954 started the ball rolling with a proposal

designed to keep highway expenditures from appearing in – and unbalancing – the budget. It would have established a Federal Highway Corporation with power to issue $20 billion in long-term bonds. But as angry opponents pointed out, bond financing could only postpone the day of reckoning and would ultimately cost taxpayers $11.5 billion extra in interest charges.

The 1956 Act effected a compromise. It kept budget balancers happy by creating a Highway Trust Fund separate from the Treasury's General Fund (and therefore outside both the budget and the federal debt limit). This Fund receives the proceeds of several new and increased highway-user taxes and pays them out as authorized by Congress. This pleased legislators who were opposed to running up future debts – and interest charges. On the other hand, the trust fund didn't please many public-finance experts. Although the practice of earmarking specific tax revenues for highway purposes has been employed for years in many states, the 1956 Act was the federal government's maiden venture in this highly controversial technique.

PAY-AS-YOU-GO PROBLEMS

Moreover the financial problems that were apparently settled in '56 didn't stay settled. Authorization schedules written into the law were based on a fairly even balance of the Trust Fund's estimated revenues and expenses. It was expected, however, that modest surpluses would accumulate in the first couple of years, while construction was getting under way. Then the fund would run into deficits (and borrow from the Treasury) during the heavy-building middle years. And finally, as the job started to taper to a close, income would again catch up and balance out the debt.

But without pausing to draw breath, Congress tacked a pay-as-you-go clause onto the 1956 act that forbids over-commitment of the fund in any single year. By outlawing the deficits that were part of its original calculation, Congress thus made a shambles of its own "long-range" plan.

Because of the anticipated early-year surpluses, it was believed that the pay-as-you-go restriction wouldn't start bearing down until about 1963. Authorizations, to be sure, must generally be made about two years in advance of actual spending, but even 1961 seemed comfortably remote. Some good-road advocates grumbled for the record, but no-one got too excited.

Several things, however, have combined to advance the built-in financial crisis. Original cost estimates (to which apportionments were scaled) were based on a 40,000 mile system. In a burst of good feeling, the 1956 Act tacked on an extra thousand miles. New estimates made in 1958 – based on rising costs, the extra mileage, and a closer figuring of work to be done – have now pushed anticipated federal-and-state outlays on the Interstate System from $27 billion to $41 billion. This means, of course, that the Trust Fund will need new revenues, and its early surpluses will have to be drained a lot faster if the same time schedule is to be maintained.

CRISIS AND COMPROMISE

The Federal-Aid Highway Act of 1958 also added its mite. That year, you may

(Continued on page 78)

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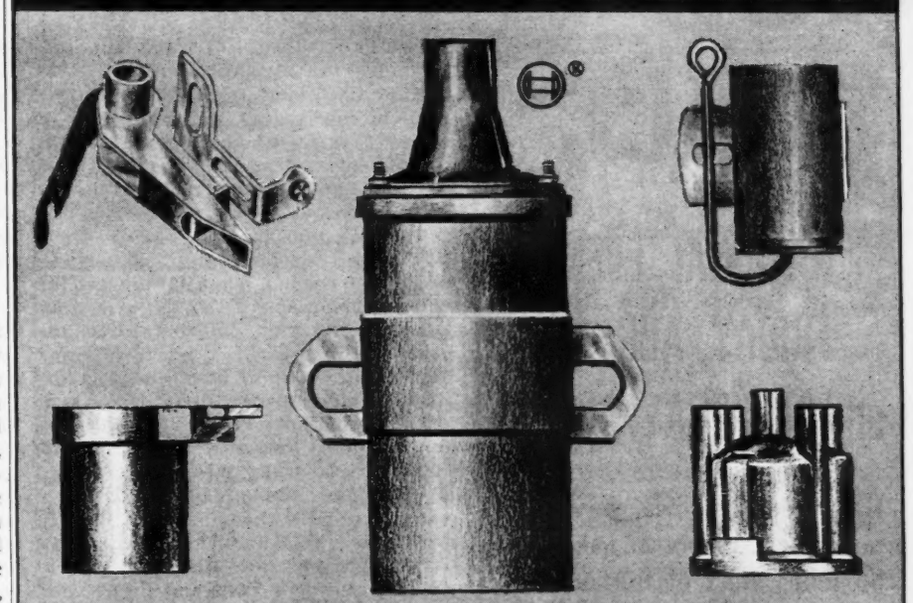

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(Continued from page 77)

recall, a recession was beginning to nibble at the fringes of the economy. Congress reacted by suspending the pay-as-you-go clause for two years, and authorizing a speed-up of both Interstate and other road projects. That overcommitted the Trust Fund by $1.6 billion.

Taken together, these elements moved the dilemma ahead by a couple of years and dropped it squarely in the lap of the 1959 session of Congress. The situation boiled down to this: without additional legislation, involving either a budget upset or a hike in taxes, no Interstate System apportionments could be made for the fiscal year beginning July 1, 1961.

Many Congressmen were outspokenly in favor of cutting back the work to fit the money; a larger number seemed disposed to let things slide, which would have had the same effect. For, after all, no-one likes higher taxes, and 1961 was then two years and one election away.

A labored compromise, which included a one-cent-a-gallon boost in the gasoline tax, was finally forced through a reluctant Congress. And what probably decided the issue was the curious fact that the dilemma had sprouted a third horn: it would cost about as much to stop the program as to keep it going on a slightly reduced scale. For it turned out that the Bureau of Public Roads, taking previous Congresses at their word, had initiated thousands of scattered projects throughout the country. Abandoning them would have produced chaos in the construction industry and involved tremendous losses and future costs. A rapid tapering-off, on the other hand, would cost even more than bulling ahead more or less on plan. But whatever course Congress chose, it had to raise more money.

STRETCHOUTS STILL AHEAD

This year we're again faced with the choice of a further tax increase or a crippling slowdown by 1963. We will probably get the slowdown, since it appears unlikely that anything positive will be done at the present session. At least one reason is that several long-awaited technical reports (that may provide a new basis for taxing different classes of highway users) are due in 1961. Meanwhile, to season the stew, several Congressional Committees have hit upon the happy election-year device of investigating the whole show.

Without doubt the investigations will turn up many irregularities and mistakes — and will magnify what they find. The betting, at the moment, is that the overall program management won't be tarred with any major lapses from virtue.

Beyond this year the prospects are for additional tax increases which — for pleasure-car drivers — will probably be small. In spite of increased Fund revenues, however, it is likely that the Interstate Program will be cut back moderately; the original 13-year completion target is probably out of reach already and it may possibly be officially dropped.

But there's virtually no chance that the Interstate Program will be scuttled entirely, or even reduced drastically below its present level. For highway planning has outgrown its britches. In some ways it is like a tame giant that sits down when you tell him to—and demolishes your favorite armchair. As the 1959 session of Congress discovered, large-scale road building starts many processes that are not easily reversed.

SLIDERULES AND SOFT WORDS

Nevertheless, the program and its future are still subject to much pulling and hauling. And keeping work moving under such circumstances can be a tricky job. The record of accomplishment to date is a real tribute to the Bureau of Public Road's vast technical competence as well as to its ability to share the credit, absorb the blame, and remain neutral in commercial and political disputes.

Bureau officials have necessarily become masters in the arts of diplomacy, compromise, conciliation, negotiation, public relations, red-tape cutting, and red-tape splicing. Some of the top brass charged with supervising the program actually spend most of their time making speeches defending it. They have also learned to applaud politely when they are rapped or investigated by politicians. And they never even murmur when their work is disrupted by a sudden demand for a report no-one will ever read.

This mildness tends to cast doubts on some of the Bureau's we-love-everybody attitudes. For example, its even-handed impartiality between asphalt and concrete pavements may be based on sound technical judgment. Or it might reflect a diplomatic reluctance to get squeezed between commercial steamrollers. Similarly, the comfortable current phrase, "on schedule" might make it hard to guess that Interstate System authorizations for 1961 have already been changed four times. The 1956 law set next year's expenditure at $2.2 billion. This was upped to $2.5 billion in 1958, and then cut back to $2.0 billion by the 1959 compromise legislation. Because of the pay-as-you-go clause, the final apportionment, made last October (1959) amounted to $1.8 billion. Bertram Tallamey, the Federal Highway Administrator, called this "a moderate cutback [and] no cause for panic." What is left unspoken is that it is also no cause for satisfaction.

Even if the Bureau's politeness is a real weakness, it must be counted as minor. This ability to remain above the battle—and thus to avoid making enemies—is probably the B.P.R.'s second greatest achievement. The first, without doubt, is its enormous prestige and know-how.

IT'S SMART TO BE DULL

The Bureau's relative immunity to criticism has been helped by the staggering complexity — and dullness — of its work. One report to Congress, made in co-operation with State Highway Departments, required over a million man-hours of effort; it presented cost estimates on some 6,000 individual sections averaging 6½ miles in length. So it's hardly surprising that few private experts, in or out of Congress, show any eagerness to tackle the Bureau's figures, forecasts, estimates, projections, or design standards.

Of greater importance is the fact that technical complications tend to fuzz over the dividing lines of legal responsibility and authority. Officially the function of the B.P.R. is limited to approving federal

aid for state projects. In practice this generally means that the Bureau guides the states into developing projects it can approve. The net result — for good or ill — has been to break down many Constitutional barriers against centralized, integrated, long-range planning.

This subtle but definite shift in the power of decision shows up in countless details. What could be more local in effect than the question of building a new shopping center in a burgeoning suburb? Yet by its approval of a route, an interchange, or the width of a right-of-way, the Bureau effectively answers this question for the locality years before it is even asked.

There's no evidence that these decisions are made capriciously, or that the Bureau rides roughshod over state, local, or regional planners. On the contrary, it co-operates closely with interested officials and private groups. The design of one road section, in North Adams, Massachusetts, involved long collaboration with state and local highway chiefs, the Army Corps of Engineers, and the Federal Housing and Home Finance Agency. The resulting job combined highway improvement with urban renewal and flood control. A bridge replacement project in Utah brought in agriculture officials and ended up as an embankment and irrigation-storage dam.

Although such examples could be multiplied many times, the truth is that relatively little urban and regional planning is being done in the United States on a consistent, co-ordinated, and official basis. And this in spite of the long history of unplanned or poorly-planned road building that now cripples most cities and many metropolitan areas.

REAL PLANNING, AT LAST?

To an increasing extent the Bureau of Public Roads appears to be taking over a job defaulted by other agencies. Thus its investigations of alternate-route possibilities will frequently include — in addition to massively-detailed cost comparisons — statistical and psychological studies and projections of social, economic, population, and traffic trends. As a condition for approving a project, it may recommend changes in municipal zoning ordinances, public transit facilities, and local traffic patterns; it may effectively require a local government to build new feeder roads.

This broad, and broadening, view of the extent of national interest in what have traditionally been regarded as local affairs may be one of the most significant products of the Interstate Highway program. Characteristically, the Bureau disclaims any intention of stepping on toes or infringing the powers of state and local governments. But in a recent speech, Ellis Armstrong, Commissioner of Public Roads, called the accelerated highway program "a catalyst for solution of the entire range of problems associated with today's industrialization and urbanization."

So in spite of all the reasons why long-range, co-ordinated, and even sensible highway planning is impossible, it may finally be on the way. If so, the Interstate System may turn out to be much more than a 41,000-mile network of shining expressways: it may be remembered as the unplanned instrument that started to bring order to the age of the automobile. —*RG*

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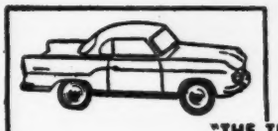

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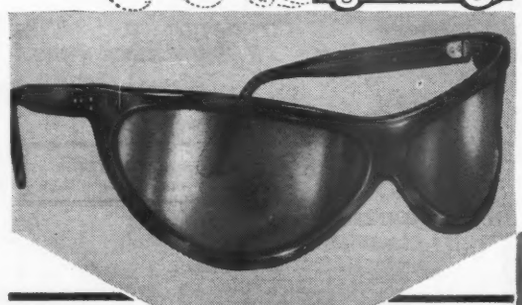

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LEADFOOT LONDONER

from page 31

have been just what he needed."

What happened in South Africa was this. Following the South African G.P., to which we'll return later, the scene of action shifted to Cape Town for the False Bay meeting. Chris was scheduled to drive a Cooper-Borgward in the feature event, the False Bay 100, but, dissatisfied with a meager ration of practice (fifteen minutes on a circuit he'd never seen before), he accepted an extra ride in a preliminary for production sedans and hardtops. His car for this dice, loaned by a local owner, was an Alfa.

While leading comfortably on the third lap, he hit an oil patch, spun and flipped at around ninety. Alternately traveling invertedly and on its hubcaps, the Alfa continued apace, coming progressively asunder as it went. When it finally stopped, Chris waited a moment to make sure nobody was going to ram him, then climbed out through a window. With deep lacerations of the shoulder, knee and elbow, but unwilling to waste so instructive a bonus familiarization session, he had a hard time convincing the attendant medics he was in a fit state to drive in the same day's 100-miler. To prove it, he executed some sample hops and skips on the sidelines. Still doubtful, the doctors said if he could walk back to the pits unaided they'd consider their verdict further. He did, so they put twenty-two stitches in him, he raced the Partnership's Cooper-Borgward and won, also turning the fastest lap at over 104 mph. Then, and only then, he let his clockwork unwind and surrendered to the ambulance crew for a closer check.

What this story proves, apart from the fact that Bristow's physical toughness is of supra-Brinell order, I don't quite know. If as Ken Gregory thinks, the mauling he took in the Alfa really threw a salutary scare into him, his insistence on racing again immediately in such a detuned bodily condition is difficult to understand. Personally I'd classify him as that rare psychological phenomenon, a man not merely born without fear but incapable of cultivating any as he goes along. This deficiency, if you'd call it that, is fortunately allied to a skill that is right out of the ordinary for any driver with his limited racing experience at the international level.

Unusual too, even slightly disconcerting, is his obvious contempt for the unwritten British tenet that, no matter what you may privately think of your own prowess or potential, you play it down overtly. "My object", he says quite simply, "is to win the World Championship" — and his inflection on the word "object" makes it clear that this is an intention, a determination, rather than just a hope. "Humility has depressed many a genius to a hermit", wrote Shenstone, "but never raised one to fame." Bristow doesn't see himself as a genius, as far as I know; on the other hand he'll take good care humility doesn't depress him to a hermit. Pressed more

closely for an opinion on his Championship future, he said he believed that in the most favorable combination of circumstances imaginable, he might win the title *this* year; if he was less lucky, and all the horseshoes he dropped landed in the laps of the competition, well then it might take two years, three years, who could say?

Considering he never raced outside the U.K. before last year's Coupe de Vitesse at Rheims, such sanguinity would be ridiculous in any driver unless he'd successfully traded gages with world class opposition at least once in his life. But this indeed he has done, and the spectacle was one the audience won't forget quickly. Scene of this memorable encounter was Brands Hatch, the event the John Davy Trophy for F.2 cars last August. Brands, although a short and relatively slow circuit, less than a mile and a quarter around, is generally conceded to be one of England's most testing courses, and certainly simulates road conditions more closely than either of Britain's *Grande Epreuve* theaters, Silverstone and Aintree.

You could use up a lot of words or very few in describing the John Davy Trophy, run in two 25-lap heats with the whole entry meeting twice, race times being aggregated to decide overall placings. Briefly, it added up to this: in heat one, Bristow gunned B.R.P.'s Cooper-Borgward into the lead at the start and thereafter enjoyed a looking-glass view of Roy Salvadori, Jack Brabham, Bruce McLaren (Cooper-Climaxes) and Graham Hill (Lotus) clear to the finish; Chris averaged 76.48 mph for the distance and turned fastest lap at 77.50. The order was anagrammed in heat two, Brabham leading throughout, Salvadori second, Bristow momentarily second behind the Australian at one stage but finally third. Brabham's speed, 76.12, was down on heat one, Chris taking the final verdict and the trophy.

It was never suggested, by or on behalf of Brabham and Salvadori, they weren't doing everything they knew to beat the B.R.P. parvenu, and if it had been, the absolute ferocity of their driving in both heats would have made nonsense of the claim. In fact, the only qualifying comment I've personally heard was made by Bristow. Alluding to Jack and Roy in the second heat, he told me "I *decided* I wouldn't pass them", and the italics are mine. Whether you believe or disbelieve any man alive "decides" whether or not to pass Brabham and Salvadori in this sort of race on this sort of course, you can take a charitable view of the quote and interpret it in the sense that whether Bristow won or placed as low as third, he'd be safe for an overall win on aggregate time. To make pretty sure of this result, he stayed within about three seconds of the leader all the way. THE AUTOCAR's report allowed he drove "a very clever race", a view from which Bristow would not dissent. In retrospect, he sees the John Davy Trophy as "one of my greatest triumphs".

It was not long after this Brands Hatch eye-opener that B.R.P. threw in its lot with Yeoman Credit, a new element in speed sport. Racing is a sideshow for Yeoman Credit, whose staple business is car financing. The roles of Y.C and B.R.P.

(*Continued on page 82*)

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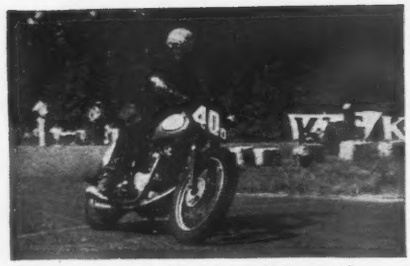

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(*Continued from page 81*)

are complementary, the former financing and the latter managing their joint racing enterprises; it's become usual, however, to identify the drivers currently concerned with the Yeoman Credit Racing Team, rather than with the Partnership, whether this is or isn't correct under the existing contractual setup. Bristow for his part speaks glowingly of the Y.C. principals, the brothers William, Paul and Fabian Samengo-Turner, and the partnership between partnerships certainly seems to run on well-oiled wheels. Its workshops at Twickenham, Middlesex, just beyond London's western fringe, are superbly equipped and generously manned, with ten experienced artisans working under the exacting eye of Tony Robinson, one-time chief mechanic to Stirling Moss. All that a Yeoman Credit driver has to do is drive, every conceivable extraneous care being taken off his mind by a highly efficient administrative machine.

Following a precedent set by Moss and three contemporaries who lost their lives at the wheel, Mike Hawthorn, Archie Scott-Brown and Stuart Lewis-Evans, Chris Bristow is the son of an erstwhile racing driver. It was about twelve years back that Bill Bristow, proprietor of a group of car trading and renting establishments in south London, acquired some fastish machinery which included an E.R.A. and an Alta and embarked on a modest sprinting program. At least one of his mounts, incidentally, had come into his possession from someone we met in last October's issue of SCI, viz, Robert/Roberta Cowell, the driver who made biological history by changing into a woman. Although not short on self-confidence, even at the age of ten or thereabouts, Chris didn't succeed in persuading adult authority to let him actually race papa's iron while he was still in junior school, but he certainly sampled it a time or two, sub rosa and in the indirect gears dictated by lack of *lebensraum* in the yard back of one of Bill Bristow's garages. A neighbor recalls occasions when Bristow senior, showing up unexpectedly, caught the kid in the act and took a well-aimed swing at him.

It was around this time, Chris remembers, that his sleep started being disturbed by a recurring dream in which he saw himself performing feats of derring-do on the racetrack, always wearing a checkered helmet like the one Jean Behra was later to affect. These peculiarly vivid visions could only mean one thing—destiny had a career of speed in store for him, so it was just a question of waiting to grow up and keeping an eye open for further portents. They came in 1956, in the guise of an MG-engined special and its constructor, Lionel Leonard, a well-known amateur designer-builder of one-off competition cars. Leonard, by arrangement with William Bristow, moved into one of the latter's garages and there went to work nailing his latest hybrid together. When he'd finished it, apart from fitting the body, Chris fell in love with the thing and smooth-talked his father into buying it for him. He stuck the body on, embellished Leonard's handiwork with a few ideas of his own, bought a helmet and executed the checkered decor he'd seen in his dreams, and entered himself for two meetings slated for the same day at different but propinquitous tracks, Crystal Palace and Brands Hatch.

The outcome of this busy debut accurately foreshadowed many a Bristow score in his later professional life: one win, one DNF. The win, moreover, was in the first race he ever contested, in the face of far from slothful opposition, and it was also typical of him that he set the fastest lap as well. That was at Crystal Palace in early August of 1956, almost exactly three years before the John Davy Trophy effort that yielded "one of my greatest triumphs".

His subsequent progression up the ladder in club and National meetings, through '56, '57, '58 and the early part of last year, followed a fairly familiar pattern, apart from two things: 1) The support he received from his father, to a total tune of around $60,000, was beyond the dreams of avarice of most youths with similar aspirations; 2) He won more races and places in this period than most youths would have collected, even given his admittedly enviable resources. He is fittingly grateful to his father for his largesse, and forebears to add, even if he thinks it, that largesse without his own unusual talent would have availed nothing, or anyway very little.

Successor to the Leonard MG was an eleven-hundred sports racing Cooper, followed by an Elva of the same class, then a Lotus Fifteen, then a Cooper derivative known as the Hume-Climax (F.2), then a Cooper Monaco. A recital of successes and setbacks, with circuits and speeds and times and stuff all catalogued, wouldn't mean much to SCI's predominantly American readership, but it deserves record that during 1958, driving the Lotus, Bristow won the seasonal 1½-liter sports car championship at Brands Hatch, which was by no means an easy thing to do. Earlier, with the sports Cooper 1100, he'd notched about sixteen outright wins in one year, 1957.

SCI staffman Warren Weith, dizzy after last November's Bahamas Speed Week, confessed himself "amazed at the ferocity with which European professionals can and do drive". Bristow had acquired an impressive smattering of this indispensable ferocity even before his enlistment by B.R.P. last June elevated him to professional rank. He may or may not be a Moss in the making, but something he does share with the master is a capacity for intensely focused concentration on his tactical objective. From the moment the starter's flag goes down he's blind, deaf and impervious to all objects that aren't directly contributory to the task of trimming lap and race times.

Discussing this temperamental asset, he said it came to him almost as naturally as breathing, rather than needing to be cultivated, and went on to express surprise at a confession of Stirling, quoted somewhere in print, that it had taken *him* about eight years to acquire it.

Another Bristow endowment is the ease and nonchalance with which he makes up-the-scale transitions from one type of car to another. The switch from sports cars to F.2 equipment never bothered him even momentarily, he says. And when B.R.P. gave him the Goodwood tryouts on a Fo

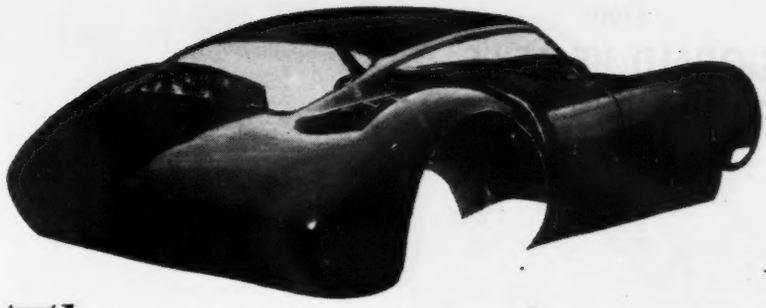
mula 1 Cooper-Climax that led to his present contract (this was the first F.1 machine he'd ever driven), "I was very, very fast", he recalls. Don't think he exaggerates, either—he was.

Yet another credit in the Bristow ledger is his feeling for a car and far from rudimentary knowledge of what makes it tick or stop ticking—a factor that's put money in the bank for Brabham, inter alia, before now. Not particularly fluent or graphic, conversationally, on general subjects, he nevertheless has the valuable knack, acknowledged and confirmed by Ken Gregory, of being able to interpret mechanical symptoms accurately and lucidly for the benefit of boffins. Regarding his present prowess purely as a driver, Gregory says, (and the record backs his assertion) Chris is already a jump ahead of the stage poor Ivor the Driver (Bueb) had reached when he died. Any comparison between Bristow's late team-mate Harry Schell was not possible when this was written because of Harry's vast fund of racecraft—a factor that can, in a team setup, offset a rival's hypothetical superiority in straight lap time terms.

In spite of the native ferocity noted earlier, Chris is, according to his B.R.P. associates, easy on tires and such sensitive parts of an automobile as the transmission and brakes. For personal transportation he runs a 3.4 Mk. 11 Jaguar with "S" trimmings, having graduated from two 2.4's and a DB2-4 Aston Martin. Careful with his skin in street company he doesn't know from Adam and Eve, he handles his road machinery with almost incongruous restraint. A bachelor and of an abstemious habit, he smokes little, drinks less and not at all in the racing months. He weighs 160 pounds, about the same as Moss, but at 5' 11" is slightly taller. A springy gait and erect bearing give him the look of an athlete, and indeed he plays soccer with amateur expertise for a local team in the winter.

In his first season with the B.R.P./Y.C. consortium, which also was his first on F.2 cars, Bristow placed second to Moss in The Autocar's F.2 drivers' championship, four and six places higher up the table than Brabham and McLaren respectively. This was quite a feat but hardly such a feat as it looks on paper because Brabham and McLaren naturally were frying bigger fish much of the time, whereas Chris, after he'd hired his services to the Partnership, drove F.2 cars in all but two of his races.

Bristow isn't superstitious but his disbelief in omens has one reservation. Perhaps in subconscious emulation of Moss, who has a partiality for expensive personal metalware, Chris bought himself a gold bracelet last summer, custom-built and inscribed with his name and blood group. He wore it for the Kentish Hundred international and had to quit with broken transmission. He wore it for the T.T. and tangled with Stacey. He doffed it for Oulton Park and Snetterton, with the satisfactory results recorded above. He put it back on in South Africa—and blew up in the G.P. capsized horrendously at False Bay. Now the fancy curlip is in banishment, to stay. With its malign influence removed, and its owner's remarkable talent still on the wax, the future could hold something pretty big for Chris Bristow. —*DM.*



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TRIUMPH HERALD

from page 68

mileage. Surely by now all stylists know that headlight lenses are intentionally designed to throw some light upward so oncoming traffic can "see" you coming around a turn or over a crest. The use of styling wrinkles to stiffen the body panels is aimless and overdone.

The first thing you notice when you slide behind the wheel is the eccentricity of the seating position. The wheel is about 2½ inches to the right of one's personal centerline and contrarily, the brake pedal is where you'd expect the clutch. The other pedals are spaced well apart but correspondingly far to the left in order to clear the transmission bulge. There is plenty of footroom and the zig-zag position of your body is something you get used to quickly. Since your torso points about halfway between the wheel and the pedals, it is offset from the seat centerline like the Morris Minor or the Peugeot 403.

NOOKS AND CRANNIES

There are six places to put odds and ends in the Herald, seven if you count the ash tray. Below the conventional, lockable glove compartment (it barely passes the "Rollei test," being 4½ x 5 x 14½ inches) is the most novel container. It's a polythene-covered, wire mesh tray about 9 x 13 wide and deep enough for a vacation's worth of maps, guides and race programs. The snap latch is somewhat uncertain at times, so it's no place for a heavy camera. More papers can be stored in the large door pockets but the really nice touch is the 4 x 6 tray atop the transmission housing. Just the place for gloves, change for toll gates and parking meters.

The trunk is very large; the makers quote 13 cubic feet which alone is enough to disqualify it as a sports car in the eyes of the hard-bitten purists. The spare tire is under a floor panel and the 8½-gallon gas tank is tucked into the left rear fender. Though there is a fuel gauge, the makers have included a reserve lever which operates like the one on a Porsche or a Volkswagen. However, it's on the top of the tank so it's not so subtle to use. The trunk lid is held open by an automatically-ratcheting prop. To close it you just lift up again, then lower it. The tee-handle incorporates a key-lock. On the sedans only, the partition between the trunk and the rear seat is nothing more than the seat cushion itself which can be folded down for carrying very long objects.

PRICE AND MODELS

The coupe lists for $2149 and the convertible for $2229, suggested retail etc. with the West Coast POE prices $50 higher. For that $80, the convertible gives you the back seat cushions as standard equipment instead of as a $40 extra plus a folding top that can be put down easily with one hand without leaving the driver's seat. There are only two latches to undo above the windshield frame, then you simply push the front up, back and then down. It moved so lightly on our brand-new, test-for-photographic-purposes-only convertible that we have no doubt that it will fall right out of sight of its own weight once the hinges have been used a few times. On the other hand, two-tone paint is not standard, it's $28 extra. The latter pains us not, while there's plenty of logic in the difference about the rear seats.

The convertible has enough headroom back there for an adult or two to sit upright in reasonable, if brief, comfort. The coupe has a more sloping rear window which makes its rear seat strictly for cargo and kids. The optional cushion takes 3 or 4 inches of what headroom there is. Since the draft-proofing around the coupe's windows was no better than what we'd expect on a roadster, we don't hesitate to recommend the convertible. Especially with that easy-folding top.

Not shown here is the sedan which lists at $1999. It has only a single carburetor and ten less horsepower but on the other hand it has 34 inches of headroom and ample kneeroom in the back seat. We suspect that the coupe and convertible will outsell it handily.

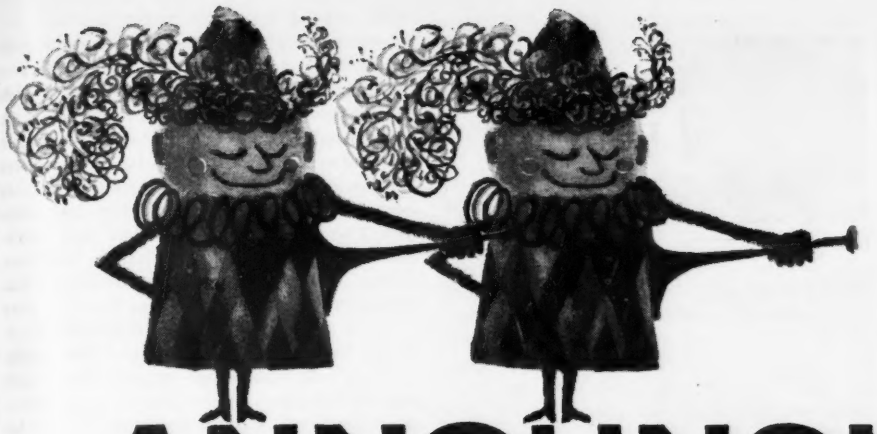
ACCELERATION . . . . .

There's only one word for it, modest. For those with long memories, it's nearly identical to an MG TC. The one-liter engine revs willingly to some 6750 rpm (a tachometer would be nice to have) but with a power peak at 6000, the driver must be equally willing. Gear ratios are slightly marred by the big step between second and third and synchros which can easily be "beaten" but the box otherwise is first-rate. The sturdy lever moves only 4½ inches between third and fourth and does not stiffen up under hard Alpine use.

. . . AND MODIFICATION

For a more modern comparison, we parked our test convertible next to its stablemate, a TR-3 roadster. What a surprise—the Herald is longer, wider and higher (by 2, 4 and 3 inches respectively). But if any eager readers are thinking of a within-the-family engine swap, we'd like to caution you against it. The tried and true gearbox and final drive would probably become tired and untrue if they had to cope with twice the torque. Admittedly, there is plenty of room under the hood and the radiator can be moved forward without distress to provide more. What does suggest itself, for those with about $1500 to spare, is the Coventry Climax single-overhead-cam engine. It's certain to mate up to the gearbox for that's just the combination used in the Elva sports-racing cars. Come to think of it, why doesn't the Standard-Triumph factory do this? It would make a fine limited-production G.T. car. It might not beat the lighter Elite, but with an 1100 cc Climax it wouldn't have to. At any rate it'd be lots cheaper, perhaps only $3500 or so.

The other temptation is to strip off the seven body assemblies, slice away the body outriggers, tune the engine still further to the teeth, centralize the seating (the drive shaft lies between the frame members, not above them) and clothe it in a sleek single-seater body for Formula Junior racing. On the other hand, one might just buy it and drive it the way it is. There's plenty of enjoyment built right in. —SCI



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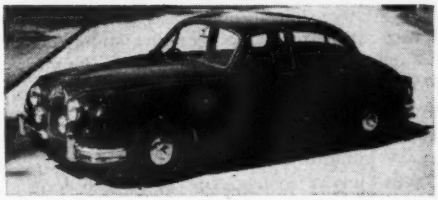

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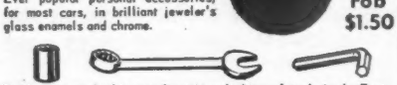

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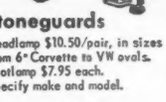

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BEAUTY BENEATH THE SKIN

from page 50

bar, Max installed the 5/8-inch Pontiac part and we are here to say that the front end just doesn't break loose. The car's quite neutral, neither an over- or understeerer to any degree, and comes as close to being a four-wheel-drifter as anything we have driven. You just set up your cornering attitude and hold it with the throttle.

Of course, the locked rear (Studebaker Champion with Cook locking spool) helps. It feels flat while cornering although photos reveal some lean. But no matter how severe the corner, the steering never gets stiff. It takes only 2 3/4 turns lock to lock, so it's easy *and* quick.

For the gals, Ina says that the car is terrific in traffic. Those race announcers aren't kidding when they say she drives it to the market. Not only to the market, but to the race course as well.

CREDIT TO TIRES

Max is emphatic in handing much of the Mk. II's handling credit to the Goodyear Blue Streaks (whitewalls, no less) that he runs. "New ones scuff in so quickly that I can go full-bore after two laps," he says. And they last. After a short race at Pomona, the latest set was run some 39 laps at Riverside and still had plenty of tread left. He has tried about everything that will fit on his 15-inch Lincoln rims but his choice is still Blue Streaks.

On the front end the tire size reads 7.10 x 15; at the rear it's 7.10 or 7.60 x 15, depending on the rear-axle ratio. Generally he uses 7.60's with the 3.31:1 axle. With the 3.7 ratio installed for shorter courses, he juggles 7.10's or 7.60's for best times.

UNDER THE BONNET

Max's penchant for Buick engines is so firmly established that it came as a considerable shock to find that he was ready to switch to something else — almost anything else — after engine failure at the Riverside race. "I was spoiled," he related. "When I built and ran '56 engines there was never any trouble — and now this." "This" turned out to be the failure we mentioned earlier—a crankshaft vibration damper, the third one, to be exact. "The first time I figured it was just one of those things. The second I felt might be my fault. But not three in a row!"

When the harmonic balancer starts slipping at high revs, several undesirable things happen. The timing mark moves (30 degrees off for Max) so the engine gets slightly lumpy. Under the prolonged stress of imbalance the crankshaft breaks, usually taking a couple of rods and pistons along. That is precisely what happened at Riverside. The method of fastening the balancer together, with a pair of flat grooved rubber discs to take up shock, lends itself to failure. The unit slips neatly around the grooves and that's all.

But there's always an answer, sometimes not easy or cheap, but an answer. Max found it in a Ford Six truck engine balancer. The adaptation was fairly simple; it meant using the Ford housing which *should not* slip, and using the old Buick balance plate and spacer disc. The spacer disc, which has multiple bolt holes, has been left with a high side so that it can be rotated to the best balance point. Some nickel welding rod joined Ford and Buick in what appears to be a happy union.

The fact that such an adaptation was necessary rankles Max. "I used to say that I ran a stocker," he says. "But with these phony little troubles it's rough." He means "stocker" in the sense that major components except all-out speed parts such as cams and intake manifolds may be purchased right off the shelf.

We asked Max why he doesn't go back to the old reliable '56 Buick mill, especially since they're currently available at bargain prices. "Very simple," he replied. "It's only 320 cubic inches, so right away you should bore at least 1/8 inch and stroke 1/4 and then you can't use standard parts any more." The '59's and '60's are a whopping 401 cubes (6571 cc) and in this league nobody has yet invented a practical substitute for cubic inches.

ECONOMY AND POWER IN RACING

For all the swept volume in Max's Buick, topped by six hungry-looking, air-and-gasoline-gulping Stromberg 97 carburetors, the fuel mileage while racing is excellent. After careful checking a figure of 7.2 mpg was determined. Many hot Corvette engines are lucky to get five mpg, a difference that can be significant in long races. During some experimentation with Hilborn injection the mileage dropped only one mpg. The carbs top an Edelbrock log-type manifold, incidentally, and there may be eight instead of six before long.

With carburetors an honest dyno reading (engine warmed, no advance curve tinkering for flash readings) comes out 305 bhp at 5400 rpm — conservative compared to what some builders claim. Torque reads 360 lb-ft at 3500 revs but it wants to continue to climb and the dyno won't hold it. "I have yet to get an engine to produce as many horses as stockers are rated," says Max. "But nobody is beating me. Conversation horsepower doesn't mean much."

The injectors add a net 24 horses. Then why not use injection? Max simply doesn't need it. There just aren't any courses where that extra power is needed or desirable for now.

CAM AND VALVE TRAIN

The camshaft is a Winfield product with 303 degrees overlap, which is quite a lot. So much, in fact, that the low-end flexibility and torque the engine displays would seem difficult to come by. But there they are. It idles nicely at about 500 revs — just like a good stocker should. The overlap has dropped cylinder compression from a stock 180 to 155 pounds. Compression ratio is only 9.5 to 1.

A fairly common complaint with hot engines is camshaft wear, something with which Max has never been bothered. Possibly one explanation lies with the fairly light valve springs — 185 pounds on intake and 170 pounds on exhaust. The engine is never turned past 7100 rpm, and that high only rarely, with no valve float. In

fact Gurney never exceeded a safe 5600 during his Riverside stint. Max's comment is that every time he misses a shift or goes to 7000 all he can see are dollar signs.

Valves have been lightened, while flash chrome lessens carbon formation and wear in the guides. It has been necessary for Max to fabricate longer pushrods, a minor irritation. He used 5/16-inch chrome-moly tubing and it rubs slightly on the side of the head. There is a solution which entails lengthening '57 Buick speed kit pushrods.

MINOR MODIFICATIONS

Virtually the only other speed adaptations are the normal ones including porting and polishing heads and boring .003-inch for added clearance. Bearings have not been grooved and apparently it hasn't been necessary. Until the balancer failed, they had been in seven months and five races without trouble.

To eliminate overheating it was necessary to remove the Buick water log, install a '58 water pump, and run a smaller crank pulley to reduce water pump speed. Also, an oil pan baffle is essential to prevent oil from sloshing around in the stock pan.

The flywheel is Buick's '57 model, machined and rebalanced.

Fire comes from a distributor that is a family heirloom. It dates to 1946, and Max has run it on nearly a dozen of his various cars. He runs a total of 48 degrees advance — an amount he finds hard to believe — but it works.

The engine applies its power through an Auburn 960-pound explosion-proof clutch. The engine adaptor is by Cook of E-40 aluminum that doesn't require heat-treating. It's light, extremely strong and won't distort.

Rummaging through the parts bin brought out the present '50 Lincoln radiator. Originally water was cooled in a Studebaker Champion core, 30 pounds lighter than the Lincoln, but the altercation with the guard rail brought forth the need for a quick replacement.

ANYONE FOR A REPLICA CHASSIS?

Nearly complete at this writing is a chassis that very nearly duplicates Max's race car. The primary difference is a longer wheelbase, 100 inches compared to 93 3/4. The experience gained in building the first chassis has allowed some refinements in the new one. For example, grease points have been reduced from 12 to four through the use of rubber bushings.

The price is not unreasonable. Delivery time is about a month and the figure quoted is $3500. This includes the chassis with suspension and steering, a new Buick engine set up much the same as the race car (or however the customer may order it), Lincoln, Buick or Pontiac disc wheels (wire knock-ons at extra cost), Buick brakes, and a Studebaker limited-slip differential with 3.31 or 3.7 gears. What the customer doesn't get is the recommended Jag close-ratio box and miscellaneous items such as drive line, pedals and master cylinder. Even so, it's not a bad deal. One might purchase a chassis and install any of several fiberglass bodies on it for a distinctive machine. Or with a little persuasion Max and Ina might build another body to match the one on Old Yaller. That *would* be distinctive. — *WT*

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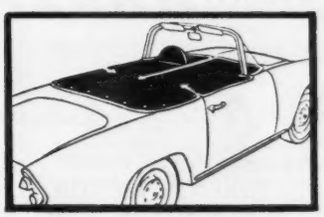

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SEVENTH TIME LUCKY

from page 35

Using the Sebring rear-end ratio of 7/35 (5 to 1), fourth gear acceleration of the OSCA is fantastic from 4000 rpm on up. The eagerness of the engine to rev with a crisp bark is a joyous feature. The 10,000 rpm tachometer includes a telltale hand that cannot be fudged back to zero by the driver, but there is no call to run up beyond the factory limit of 7800 to 8000 rpm. However, the twin-cam engine is so smooth and lively high up the range that you need to watch the tach until you learn to lift your foot by sound.

We passed the Sebring technical inspection with ease, only to run into another problem. *After* converting to Firestones, we were told there was no balancing equipment available which would accept the hubs of our featherweight (7.5 pounds) Amadori magnesium wheels. Sabiston finally located an Alemite electronic balancer, and by cutting up the original weights he was able to do a creditable job of balancing the wheels on the car.

Practice went off as planned, except that the differential unit overheated until we cut an air duct in the belly pan. We also found that the factory had painted over the grease nipples of the rear universal! Everyone in our nine-member pit crew, however, knew his job thoroughly, thanks to weekend planning sessions extending over months. In fact, anyone could do anyone else's job of timing, spotting and scoring. We had decided not to reveal the car's true potential in practice, although this demanded much self-control. The fastest anyone got us on the watch was 4:07 — nowhere near as fast as we could go.

Calibration runs on measured amounts of gas gave us our exact fuel consumption at racing speeds — 16 mpg almost on the nose. This was close enough to the factory's claim of 16.4 mpg to determine accurately our endurance with a 60-liter (15.8 U.S. gallon) tank. Our figuring went like this: pit stops at three, six and nine hours, totalling 15 minutes maximum. Actual running time, 11 hours, 45 minutes at a conservative 4:10 per lap. Total, 169 laps or 880 miles in round figures. This meant 220 miles per driving stint, compared with a potential of 253 miles for each tankful. We therefore had a safety margin of over six laps, which during the race became almost 10 laps as our gas consumption stretched to nearly 18 mpg.

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Now let's take a peek at the Index of Performance formula as it affected us. This formula determines "little d", or the *minimum* number of miles you must cover in 12 hours for a given engine size. In our case, $\frac{825 \times cc}{cc + 250} = \frac{825 \times 746}{996} =$ 617.9 (618) miles.

"Big D", the distance you anticipate covering (or actually do cover) is governed by laps speeds and pit stops. With us, as we have seen, it was 880 miles. The Coefficient of Performance is next determined by dividing "big D" by "little d": $\frac{880}{618} =$ 1.42, or a 42 percent improvement. Our objective, then, was 169 laps at an average of 73.25 mph for an Index of 1.42, with a 15-minute maximum for pit stops. What we actually achieved was 170 laps at an average of 73.464 mph for an Index of 1.4306! Pit stops totalled 13 minutes, 12 seconds, including a complete tire change. This accurate forecast enabled our Crew Chief, Maurice Nix, to signal the required lap speeds as the hours went by, but because of a groundless fear of overstressing the engine, we left our effort almost too late.

The only cars that really bothered us as Index contenders were the new Porsches. During a pre-race chat with Gendebien, he intimated that his lap times would probably average four to five seconds less than we had figured. This called for an upward revision of our own lap times by five seconds, and we therefore should have opened up sooner than we did and kept at it harder. During my initial drive, for instance, despite a poor start due to a flooded engine, I covered 45 laps, of which the last 15 were all at 4:03 or under. Despite the heat (90-plus in the cockpit) there was no real strain once the OSCA found the groove, and the temperature gauge stayed pegged at 80 to 85°C. The chart showed four consecutive laps at 4:02, one at 4:01, two more at 4:00 and finally one at 3:59 and a fraction which earned me frantic "SLO" signals. This was no doubt sensible, but as it turned out, neither Jack nor I over-revved the engine at any time.

The OSCA's 5 to 1 axle ratio confirmed my belief (based on six previous years) that you cannot undergear a car for Sebring. In fourth, along the 4700-foot straight, the highest we saw was 7500 rpm — still below engine peak! At 15 mph per 1000 rpm, this gave us over 112 mph, yet called for second gear in only two places — the Warehouse Hairpin and Webster Turn. Handling is good beyond belief; for instance you could take the two lefthanders at the top of Pit Straight in fourth gear with the right clog well down. The car would go into a neutral four-wheel slide which could be controlled at will by slightly lifting the throttle foot. Through the Funnel and Esses, it was 8000 in third — and that was where we could steam right by many bigger cars.

Jack managed 38 laps before he was overcome by the heat, but by then we already held third on Index and a three-lap Class lead. At six hours we changed both rear tires and the left front, just before I took over the 4-7 p.m. stint. The setting sun and the absurd F.I.A. windshield, opaque with bug juice and road dirt, seriously impaired vision, but by 5:30 p.m. we had increased our Class lead to five laps and were second on Index. We had also climbed from 39th to 16th place overall. At 7 p.m. we changed the right front tire which was showing canvas. Luigi Chinetti, New York OSCA distributor, made this possible by kindly lending us an extra wheel. Jack did a yeoman job on that final stint, getting his lap times down to 4:07 in the dark, with almost no brake pedal left. Anyway, it was seventh time lucky with a superb little car that never faltered. Even on distance, only the Porsches and Ferraris finished ahead of us.

—JB

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HOW TO BUILD A WANKEL

from page 46

drawing on the plug's location, though. In order to make it easier to install and to avoid upsetting the bolt pattern holding the three-layer combustion chamber together, the plug is mounted through the front side plate. It is located right at the combustion chamber's waist. To avoid interfering with rotor movement, it does not extend into the chamber. It is in fact masked, firing through a hole only 3/32-inch in diameter. Originally the hole was 1/16-inch but enlarging it and setting a wide plug gap (The spark actually jumps direct to the case from the center electrode.) has greatly improved the ignition.

A small model airplane tank filled with a 5-to-one mixture of gas and oil is mounted on the same oil-soaked two-by-four that carries the engine itself.

For starting, a quarter-horse electric motor twice the size of the rotor engine is mounted on a hinged panel at the end of the two-by-four. A vee-belt connects the motor's large pulley to one of the small ones on the rotor engine. When the "starter" is plugged in, the belt serves both as clutch and transmission.

First the engine motors reluctantly, popping occasionally as the spark advance and mixture are fiddled with. When the adjustments begin to get close, the sputtering becomes steadier. Relaxing the belt tension tells you whether or not the combustion process is self-supporting. As the massive case warms up, ignition improves and soon it is possible to relax the belt drive completely and finally unplug the electric motor. Using a musician's pitch pipe to check exhaust note frequency, the Thomases find they can run the prop-equipped engine as high as 6400 rpm and as long as five minutes at 6000 rpm, with no signs of seizing.

Felix Wankel's know-how not being available, the first troubles were with the seals. They were insufficiently radiused and started dancing against the chamber walls, scoring them. The new ones have caused no difficulty and, in fact, have started to wear away the marks left by the first ones.

What's next for the Thomases? Will they improve their engine and strive to increase its output? Apparently not, for when SCI visited them they were all enthused over plans they'd worked up for an automatic transmission! They built the Thomas-Wankel only to prove the principle to their own satisfaction, in which they certainly succeeded. We think their success makes another very important point: that the Wankel principle is not merely a laboratory curiosity that can only be duplicated with tremendous resources and esoteric knowledge; that it's a superbly simple and logical way to produce power; that its specific size is no more limited than is that of a single piston-engine cylinder. The Thomases have forged another link in the chain of evidence that indicates that Tomorrow is indeed Here. —*SFW*

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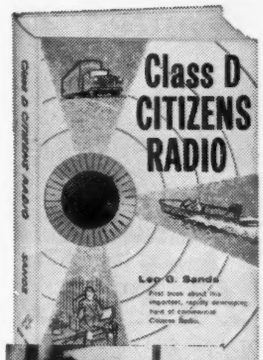

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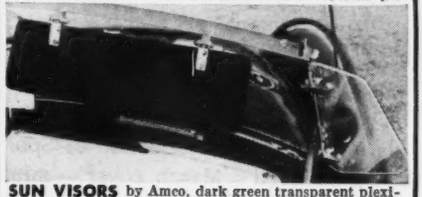

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VOLVO 122 S

from page 55

accurately so. When our test 122 S was "rat racing" Art Riley and his 544 through some of those delightful winding roads in the Massachusetts and Connecticut Berkshires, we found that the 122 S's lower build and wider front tread added up to a shade better handling on fast, open bends. However the 200-pound-lighter two-door was nimbler on tight hairpins, and several seconds faster around the circuit at Lime Rock (1:17 vs. 1:21).

Steering, via a cam and roller ZF-built gearbox, is low on friction and high on road feel. You get an accurate idea of what's going on without being fatigued by wheel kickback. The ride has similar virtues. The very firm seats, though not bucket-like, prove to be very comfortable even on long journeys. You don't wallow around in them, though you may occasionally slide a bit. Making up for their firmness is the well-located, supple coil spring suspension which absorbs all sorts of difficult bumps and jars without protest. The complaint of too little lateral support is met by the usual rejoinder: the seats are easy to get in and out of.

The two seats adjust through about six inches and in the most rearward position give enough legroom and thigh support for lanky six-footers. The large 17-inch steering wheel clears the seat cushion by six inches and can be as much as 20 inches distant from the seat back. The front of the seat cushion rates the term "chair height"; it's 12 inches above the floor.

Frequently a four-door sedan is harder to enter than a comparable two-door because the doors are narrower. The 122 S loses no points on this; its doors are plenty wide.

Alongside the competitive "compacts," the 122 S's price tag is steep at $2,80 ($2,895 on the West Coast). However, it isn't fair to compare it directly with the stripped domestic price-leaders because the Volvo 122 S comes with many "optional extras" as standard equipment. These include heater and defroster, white sidewall tires, undersealing and rustproofing, safety padding on the dash and sun visors, wheel balancing, cigarette lighter, vinyl upholstery, fittings for the safety harness. The latter is a worthwhile option (about $ per pair) that loops across your chest and lap both, each one using three attachments to the car. Unlike earlier Swedish shoulder harnesses, it does not weigh heavily on your chest, since the upper attachment to the door post is now higher than before.

As a final inducement, the Volvo asks to be lubricated only at 3,000-mile intervals and then only eight grease fittings need be sought out by the grease gun. Volvos have earned themselves a fine reputation as cars that satisfy. They go and they stick to the road. They stick together and they don't cost an arm and a leg to keep running. From all appearances, the more luxurious 122 S is in the same quality tradition as its starker sister, the PV 544.

—John Chris

CLASS E CHALLENGER

from page 64

stress load by being riveted to the bottom frame rails and cross braces. The top and side skin, however, are not stressed and merely serve as a covering for the rest of the chassis. Nestled under the hood just ahead of the passenger seat is a 17-gallon aluminum fuel tank made of .064 gauge 3001 alloy. The well-baffled tank contains a quick filler cap, plus a unique fuel gauge which owes its origin to the gauge design on a coffee urn. It is merely a clear plastic tube connected to the top and bottom of the tank. As fuel is poured into the tank, it rises to the same level in the tube. It's a simple matter for the driver to take a quick look at the tube to determine how much fuel he has left.

The engine's dry sump system has its oil carried in a cockpit-located container made of the same material as the fuel tank. Capacity here is five gallons, but only 3½ gallons are carried to assure ample dead air and foam space.

Power by Porsche has become synonymous the world over for something that goes. Since as you can't do much better than that, the double-overhead-cam was taken out to 1600 cc to gain a Class E rating. The treatment on the top end was accomplished by replacing the barrels and pistons, plus doing some machine work to open up the case and heads to accept the bigger cylinders.

With the modifications made by Quiver Motors, Miami, lightweight Mahle pistons are employed, producing a compression ratio of 9.8 to 1. This is slightly below the 10.5 or 11 to 1 used by the RSK's, but it means an increase in dependability in exchange for a slight decrease in power. Rickert estimates he is pulling between 140 and 165 horsepower, which isn't too far behind the K's. And with a lighter-weight chassis, the difference should be more than nullified.

Another modification is the adoption of 42 mm Webers against a K's 45 mm. With the larger-venturi carburetors, a Porsche engine tends to starve out momentarily upon heavy throttle application from a slow corner. The 42 mm setup gives a smoother application of power.

Checks showed that the gear lube temperature was running hotter than the engine oil, so Webb rigged an oil cooler to handle the lube in the rear end exclusively. This lazy solution cured the trouble.

The sum of $2500 will obtain for a buyer the tubular frame with bars, all the skin construction including the stressed underpan, both the fuel and oil tanks with plastic tube gauges, a ring for the engine mounting if desired, and all the mounting brackets. From there on, it is up to the individual to determine just how deep he wants to go. Choices can range all the way from the ultra-expensive Porsche-OSCA type powerplants down to the Corvair opposed six which, by the way, happens to be narrow enough to fit. —*GM*

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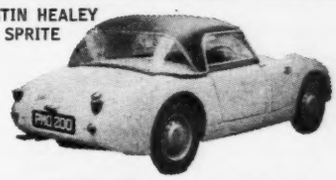

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THE MAGIC OF A NAME

from page 42

she had to be lifted from the machine afterwards and was in great pain the whole time.

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"She gained the British Racing Drivers Club gold star, which is the highest honour we have and is not given just for winning races. With the Miller at Brooklands she did a lap at 135.95, though she did not know the track and the car was unsuitable for it. The lap record was 140 at the time.

"When young, Gwenda amused herself by straying about Canada with a sledge and a team of full-blooded huskies, miscalled 'dogs' and taking a lot of controlling. This by herself, by the way. Also, she crossed the North Sea from England to Scandinavia in an open motor boat when the sea was running a storm which would have scared the pants off a Viking of the old days.

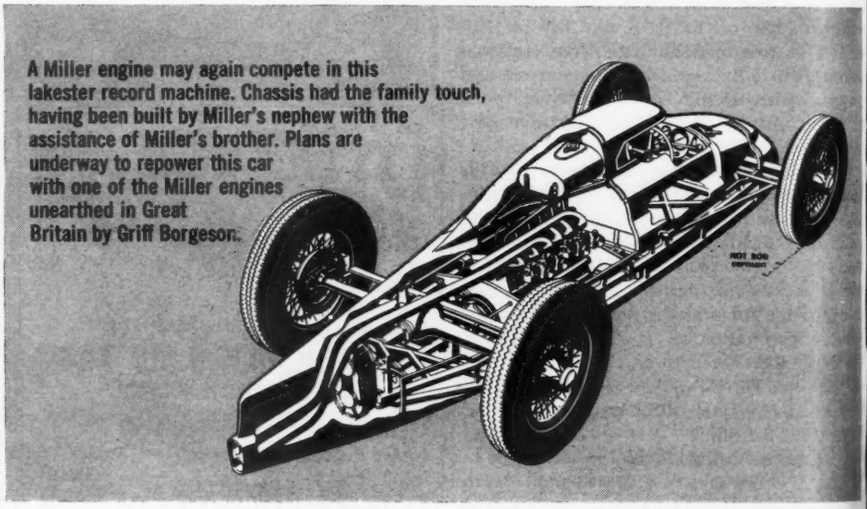
"She knows a great deal about mechanisms and is entirely feminine. She is entirely Irish-Cornish-Celt. At the moment she and Douglas Hawkes trundle 'round the Mediterranean in a ship, the *Elpis*, and are entirely happy. A very wonderful little lady."

Glubb. A not-obviously magical name; a race of giants.

By July of '59 Stuart Young of Weldangrind Ltd. was heard from and maddeningly lethargic communications were under way. Said he, "I understand that you are interested in purchasing a genuine Miller. We have two engines and one is, in actual fact, a genuine Miller. The Miller-Derby has been modified from a point of view of the rods and pistons but the originals are available." He quoted a sensible price for the pair and I rushed a deposit, along with a serious query concerning the whereabouts of the Derby Miller car itself. This question was never answered.

Not aspiring to own all extant Miller machinery nor being financially equipped to do so, I transferred my interest in the Derby-Miller equipment to ardent Miller enthusiast Mark L. Dees. Attorney Dees, Bonneville contestant and connoisseur of fine machinery, took delivery of the basket-case engines in Los Angeles in March of this year. The "in actual fact genuine Miller" turns out to be one of the perhaps two or three surviving Miller 122's. It differs from the 91 only in scale. The smaller, 91-type Derby Miller engine has its own beefed-up crankcase in which the name Derby is cast. These engines, along with the 91, will be described in detail in an early part of this series.

Given a brace of Miller engines, what do you do with them other than polish and admire them? While awaiting the arrival of his engines Mark Dees had been sleuthing on his own. He tracked down the whereabouts and availability of the Eddie Miller lakester. This machine, powered oddly enough by a 248-cubic-inch Pontiac flathead six engine, clocked 162 mph at Bonneville in 1953. The remarkable workmanship on this somewhat-vintage straight-away car betrays its thoroughbred lineage. It was designed and built by Eddie Miller Jr. (Harry's nephew), with the important assistance of Eddie Sr. (Harry's brother). Eddie Sr. was a prominent *mecanicien* ("mechanic" simply isn't the word for these practical engineers) with Duesenberg, later with Miller, Lockhart and others. He is remembered particularly in Southern California for his key part in the dry lakes duel between Gary Cooper's Duesenberg SJ and Zeppo Marx's Mercedes-Benz SS. Both Eddies worked with Hilborn on the early development of his fuel injection system. Considerable work on the lakester was done by Jim Nairn, the master experimental machinist who has played a vital part in the Scarab Formula I program. Dees now has added the Miller lakester to his stable and has plans to power it with various engines, including, hopefully, at least one of Gwenda's Millers. Will the circle be unbroken? We'll see. —*GB*



A Miller engine may again compete in this lakester record machine. Chassis had the family touch, having been built by Miller's nephew with the assistance of Miller's brother. Plans are underway to repower this car with one of the Miller engines unearthed in Great Britain by Griff Borgeson.

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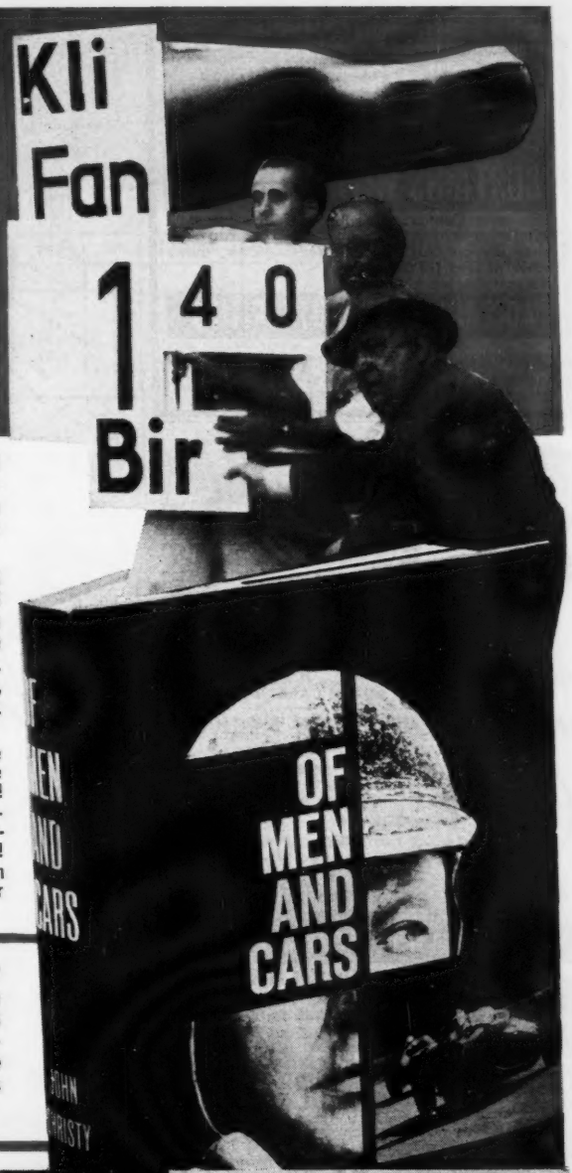

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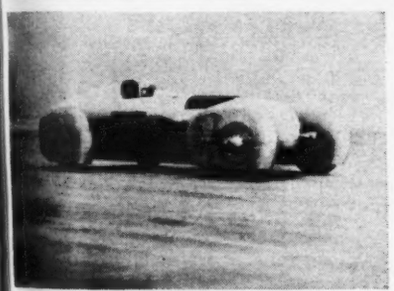

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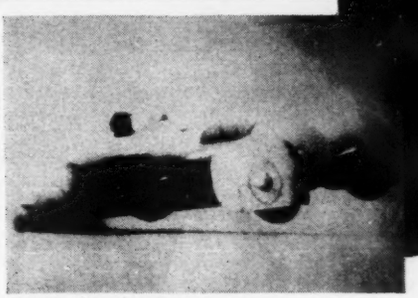
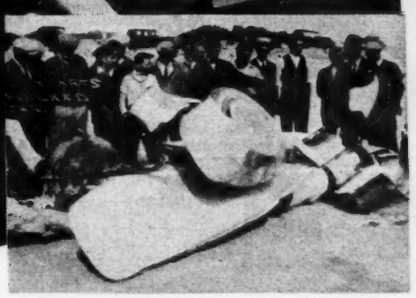
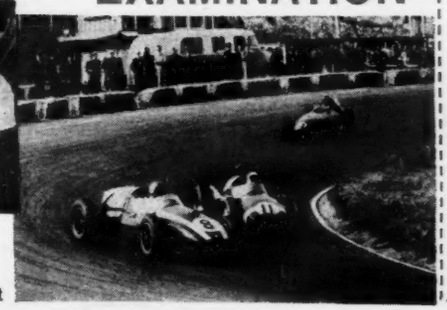


a rear tire shreds—his Stutz leaps up...



and comes to rest a twisted wreck.

You wait with the chief-driver in the pit "sweating out" every hour of the race!



Moss (11) and Brabham (8) taking a corner at the Dutch G. P. Zandvoort

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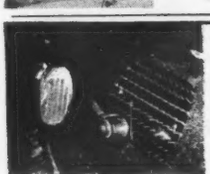

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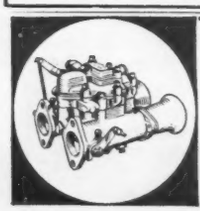

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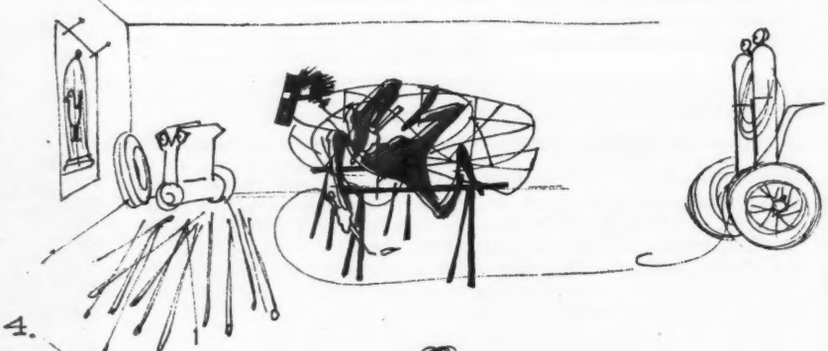

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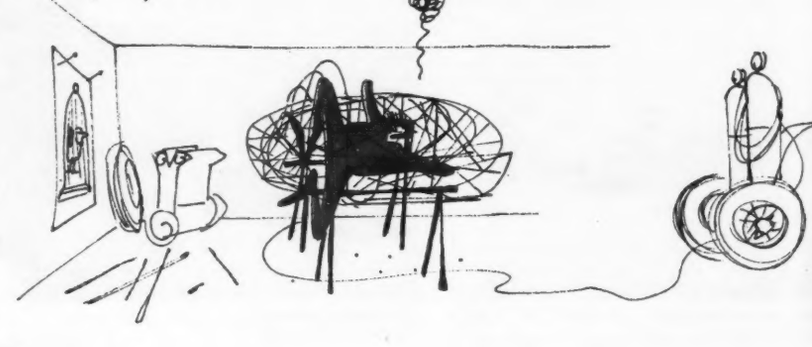

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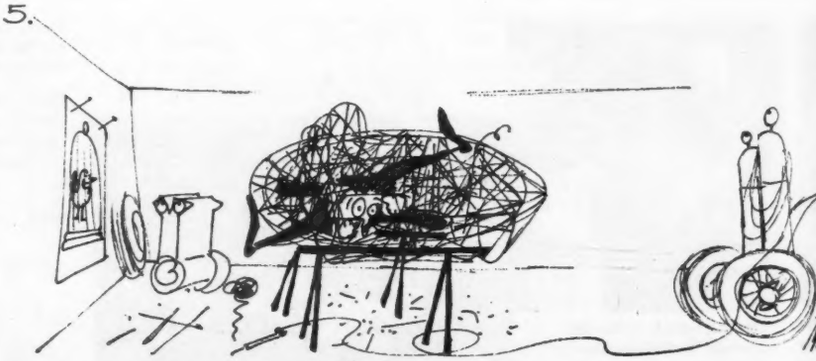

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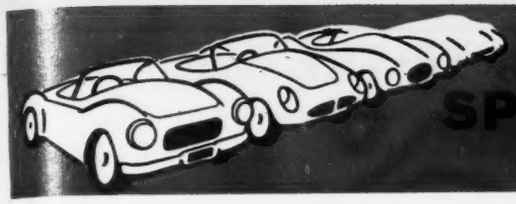

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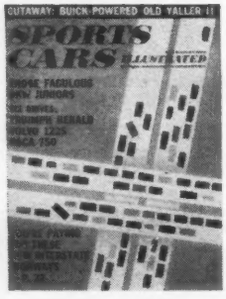

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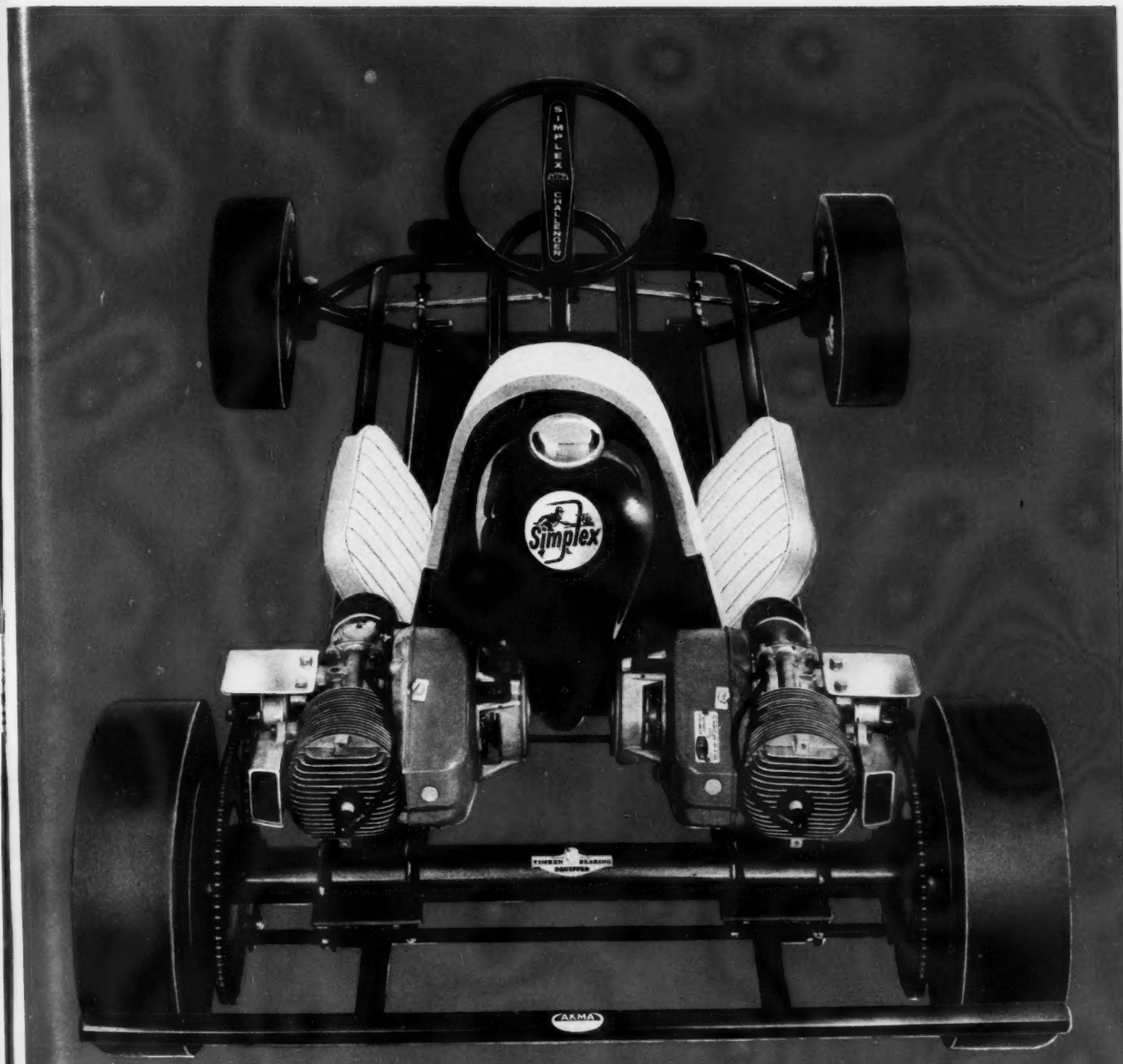

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